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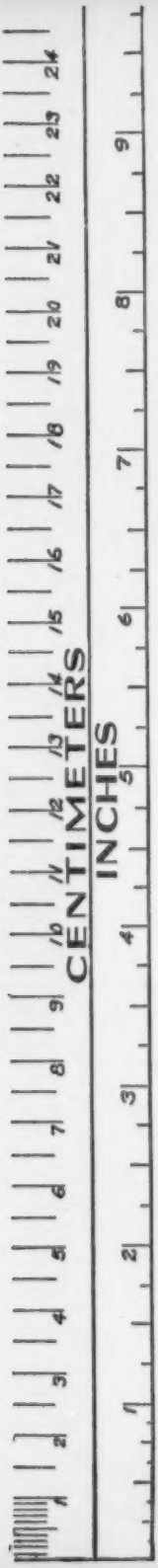

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AMERICAN ANTIQUITY

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SYMPOSIUM ON RIVER VALLEY ARCHAEOLOGY

J. O. BREW, CHAIRMAN, AND OTHERS

INTRODUCTION

ON December 28, 1946, during the forty-fifth annual meeting of the American Anthropological Association, a symposium on River Valley Archaeology in the United States was conducted under the auspices of the Committee for the Recovery of Archaeological Remains. The Committee was organized in 1945 to represent American Archaeology and Anthropology in the emergency brought about by the extensive Government program for flood-control and irrigation. Plans for hundreds of dams in the major and minor river systems of the country are completed. Construction is already under way on some of these and large scale realization of the program is imminent.

The membership of the Committee for the Recovery of Archaeological Remains is: Major William S. Webb, University of Kentucky, Lexington, Kentucky, chairman, and A. V. Kidder, Carnegie Institution of Washington, 10 Frisbie Place, Cambridge, Massachusetts, both appointed by the American Council of Learned Societies; Frederick Johnson, R. S. Peabody Foundation for Archaeology, Phillips Academy, Andover, Massachusetts, secretary, appointed by the Society for American Archaeology; and J. O. Brew, Peabody Museum, Cambridge, Massachusetts, appointed by the American Anthropological Association.

The Symposium at Chicago was designed to present the current status of the River Valley Program to the anthropological profession. The following seven papers were read: "Coordinated River Valley Projects in Peru and Elsewhere" by Wm. Duncan Strong; "The Work of the Committee for the Recovery of Archaeological Remains; Aims, History and Activities to Date" by Frederick Johnson; "The Role of the National Park Service in River Basin Archaeology with Particular Reference to Inter-Bureau Agreements" by Herbert E. Kahler; "The 'Head Office' in the Smithsonian and Cooperation with State and Local Institutions" by Frank H. H. Roberts, Jr.; "The Missouri Basin Archaeological Survey in 1946" by Waldo R. Wedel; "The University of Nebraska and the Missouri Valley Project" by John L. Champe; and "The Archaeological Survey at the Allatoona Reservoir, Georgia" by Joseph R. Caldwell.

These papers will now be presented in the order listed. The first, by Wm. Duncan Strong,[1] provides the background and whatever small amount of precedent there is, in the United States and elsewhere, for this new type of archaeology upon which we are embarking. The next three papers, by Johnson, Kahler, and Roberts, describe the organization which has been created to direct and administer the program. They contain the concepts and aims of the groups involved and present plans for the future insofar as such plans can now be envisaged. The three concluding papers, by Wedel, Champe, and Caldwell, are progress reports of work already accomplished in the field.

Along with the many details put forward officially for the first time these papers reveal two facts of paramount importance to American anthropologists: the great obligation with which we are faced, and the tremendous opportunity with which we are presented. Vital information of American prehistory must be salvaged from the valleys before the waters rise. The collection of that information, in the time allotted, will be a harrowing and arduous task but in obtaining it we shall add immeasurably both to our store of knowledge and to our professional stature.

The anthropological reader will also gain from these papers some measure of appreciation of our great debt to the Bureau of Rec-

[1] Chairman, Committee on Basic Needs in American Archaeology, National Research Council.

lamation, the Corps of Engineers, and especially to the National Park Service. All of these agencies had made overtures toward the preservation of the archaeological data in the river valleys before the anthropological profession became conscious of their impending inundation. Without the aid of these agencies, before and after the archaeologists entered the lists, the program as outlined in the following pages could not have been achieved. In addition to our appreciation of the work of the men mentioned specifically by name in the following reports, the Committee for the Recovery of Archaeological Remains, representing American Anthropology, wishes to express its gratitude to A. E. Demaray, Associate Director, and to Ronald Lee, Chief Historian of the National Park Service, for their vigorous and very successful efforts, which still continue, in behalf of American Archaeology.

J. O. Brew, Chairman

THE COORDINATED RIVER VALLEY APPROACH—A WORLD PROBLEM

From time immemorial the river valleys of the world have been the trade routes and living centers of human society. It might be estimated, as it has for the region of the United States, that some eighty per cent of all the archaeological remains in the world occur in only two per cent of its area, that is bordering or in conjunction with its river valleys. The rise of Old World civilizations have in large part been traced by careful archaeological excavations in the valleys of the Nile, the Tigris, the Euphrates, the Indus, the Yangtse-Kiang, the Yellow, and in the river valleys of Europe and northeastern Asia. The same is true in the New World where less work has been accomplished on such vast drainages as the Yukon, the Columbia, the Mississippi-Missouri, the Orinoco, the Amazon, the Paraná, and lesser, but important, rivers in Peru, Ecuador, and Colombia. It is obvious, therefore, that engineering projects, governmental or otherwise, which involve dams and consequently flooding of these riparian regions should include the archaeological recovery factor as an integral part of each program.

There are two main reasons for this conclusion, the first entirely practical, the second more intangible but equally important. First, the buried human deposits in the world's river valleys contain the main evidence of the long history of the domestication of plants and animals. Modern agriculture, which has resulted from this ancient sequence of trial and error, has still much to learn from this earlier record. Plant geneticists and archaeologists work hand in hand to trace out the effects of changing river valley conditions on the development of innumerable cultivated plants and to determine the time periods involved in these domestication processes. The knowledge thus gained has already been put to practical use. Archaeological research also throws light on the succession of climate changes from ancient to modern times including such probably cyclic phenomena as drouth, erosion, flooding, and silting, and here knowledge of the past is essential to future prediction. Likewise, the vast cemeteries of all periods of human occupation in the river valleys of the world contain evidence on the history of health and disease as well as the entire development of human culture and the evolution of the human species.

The second, though intangible, value of this ancient human record can likewise only be suggested here for it, too, is widely ramifying in its effects on the modern world. All thinking mankind is vitally interested in its own past and, beyond the exceedingly brief period of written history, the entire history of man must be recovered from his ancient rubbish heaps, dwelling sites, mounds, and ruined temples, by careful archaeological techniques. Such excavations not only yield the basic materials for scientific reports and resulting popular accounts but they also yield specimens showing the everyday life, the religion, and the fine arts of our common ancestors at all stages of prehistory. These, displayed in national and local museums, interest people in all walks of life. Prehistoric archaeology is one of the most popular scientific subjects in modern American life, as it is throughout the world. Thus, the great loss which would ensue should large portions of our river valleys be flooded without our first taking full responsibility for archaeological recording and preservation would have very disastrous practical, historical, recreational, and aesthetic results to both the present and future citizens of the United States.

It is pertinent to note that this state of affairs is fully recognized by most foreign nations including the vast regions controlled by the Union of Soviet Socialist Republics. Within these Russian and associated states archaeological sites and materials are regarded as belonging to

the nation and before any archaeological site can be disturbed, either by individual or state action, it must be scientifically excavated. This is well indicated by a recently published report on "Archaeological Monuments, their Protection, Description and Research" in the territory of the Russian Soviet Socialist Republic.[2] Archaeological sites are designated as "most precious historical documents for the study of the remote past of our country. . . . Therefore, the archaeological excavations can be conducted only by qualified people, who by applying all necessary precautions insure future possibilities of complete study. . . ." This is followed by a detailed listing of qualifications for excavators and definitions of aims and objectives, including publication of the results.

The Soviet Government has encouraged archaeological work in all parts of its vast territory. Every great engineering project, if archaeological disturbance is involved, is preceded by archaeological survey and accompanied by archaeological salvage work. In the Kirgiz area during the construction of the Great Chu Canal, which follows the ancient Mongol caravan route, and involved the labors of 31,000 collective farmers, twenty-six archaeologists were assigned to direct archaeological research. This has yielded very important information on the periods from the Bronze Age to the time of Tamerlane, who died in 1405, and whose body was uncovered by the Soviet scientists. Between 1946 and 1950, Soviet archaeologists plan to complete their preliminary ten-year survey of the entire country, from the western Ukraine to northeastern Siberia and from the far north to southern Armenia. During the season of 1945-46 about thirty archaeological expeditions were in the field. When the above facts are considered in conjunction with the fact that many Russian archaeologists were at work during the last war, even while the guns were pounding at Stalingrad, it can be seen that the Russians regard archaeology as a very important and practical matter.

A news report in the *New York Times* of January 28, 1947, indicates that work in the Russian river valleys still continues as part of their developmental projects. The item reports the excavation of a large burial ground dating from the first or second century B.C. in connection with the Minchegaur hydroelectric power plant in Azerbaijan.

In England, although the emphasis there is not upon reservoirs in river valleys, similar problems are being met. The Council for British Archaeology, established in 1944, has developed means for meeting emergency situations which have arisen in connection with the rebuilding of bombed sites, relocation of roads, etc. Included are "areas affected by the development and extension of agriculture and industry, . . . house building and quarrying." In the constitution of the Council the relationship between the archaeologists and the government is defined as follows:

> Insofar as the agent of destruction in any of these matters is some part of the central government, the situation is met by liaison maintained with other departments by the Ministry of Works (Inspectorate of Ancient Monuments) . . . schemes are inspected from the Admiralty, War Office or Ministry, Forestry Commission, Electricity Commission, Ministry of Agriculture (Catchment Board and War Agricultural Executive Committees). In addition all Town Planning Schemes and all proposals for new housing by local authorities are inspected. Any schemes which are subject to legal inquiries by the Ministry of Health are similarly dealt with and information is now received of the opening of new stone quarries.

In the New World the potential scientific and historic richness of our own river valleys is realized by very few. How extensive the historic and prehistoric evidence of culture changes may be even in a very small river valley is well illustrated by the 1946, Virú Valley Project of the Institute of Andean Research.[3] Here six North American and two Peruvian scientific institutions have been cooperating in an effort to determine the relationships between man and nature, through time and space, in one small river valley some forty miles long and fifteen miles wide. The Virú Valley was selected because it was small and had supported one of the most complex native civilizations in the Americas and also because it is today a minor but representative agricultural unit in the modern economy of coastal Peru. The work, which is still in progress, involves the coordinated research activities of geographers, historians, ethnologists, and archaeologists.

[2] П. А. Сухов. Археологические памятники, их охрана, учет и первичное изучение. Москва, Издательство Академии наук СССР, 1941, pp. 108–13.

[3] Willey, G. R., "The Chiclín Conference for Peruvian Archaeology, 1946," AMERICAN ANTIQUITY, Vol. 12, No. 2, pp. 132–4, 1946.

For present purposes, however, all that need be done is to sketch in the surprising richness and depth revealed by six months of archaeological survey and excavations in the Virú Valley. Around the edges of the valley 350 living and ceremonial sites were located and later dated by a combination of surface survey and stratigraphic excavation. This number could undoubtedly be doubled if the cultivated areas of the central valley were to be surveyed with equal intensity. Not including the modern and the colonial, eight major culture periods were determined and continuous cultural deposits to depths of eight meters were found at several sites. At two sites refuse deposits of seven meters in depth were found in which only one prehistoric culture was represented throughout, while in other sites clear superimposition of seven cultures occurred in deposits of less than five meters in depth. Scores of great, adobe temple pyramids and many large living compounds were mapped and assigned to their respective culture periods. Finally, a long pre-pottery period, hitherto unknown, was discovered. These earlier people cultivated plants but did not know corn or maize. The deposits of this early culture were over ten meters in thickness. Thus, in one small Peruvian valley, the coordinated work of several institutions in six months' time outlined some three thousand years of human history. This included the Colonial (Spanish), the Imperial (Inca and Chimu), the Florescent (Mochica), the Formative, the Early Pottery and the Pre-Pottery, and still other epochs in the over-all culture history of Peru. Since the Virú Valley is next to the smallest of all those on the Peruvian coast, it can easily be seen how extensive are the problems that await us in the larger river valleys of South America.

In North America, the Missouri Valley alone is some 2,500 miles in length and it, too, is bordered by thousands of prehistoric sites. Each of these represents a potential paragraph or chapter in the growing volume of native American history. It is this immediate and momentous problem of salvaging human history as the waters rise with which the present symposium is concerned. This is a problem where the government of the United States must do much basic planning, survey, and salvage work, but it is a problem which also calls for the full, integrated participation of all state and local organizations. The people and the governments of other countries, such as those of Scandinavia and Russia, have risen to meet similar problems and it will be a sad reflection if this cannot be done by the people and the government of the United States of America.

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THE WORK OF THE COMMITTEE FOR THE RECOVERY OF ARCHAEOLOGICAL REMAINS: AIMS, HISTORY, AND ACTIVITIES TO DATE

In 1945 the Planning Committee of the Society for American Archaeology learned that the Federal Government was completing plans to build a number of multi-purpose dams on the Missouri River and its tributaries in Nebraska, Kansas, Wyoming, Montana, and the Dakotas. In addition, it was discovered that plans for other river valleys were in an advanced state. We learned that dams were to be installed in Idaho, Texas, Oklahoma, California, Oregon, Washington, North Carolina, Georgia, Ohio, Pennsylvania, and a number of other regions. It was obvious that the Federal Government had embarked upon a large scale program intended to develop the river valleys of the country.

The damming of the rivers will create large reservoirs some of which will be 150 miles long and many 20 miles long or more. The area covered by these flood waters is that in which the former occupation of the continent was concentrated. This flooding will render it impossible for archaeologists to investigate the areas in the future; a vast amount of essential information concerning the prehistory of numerous important regions will be obliterated. This information is a national cultural resource for which archaeologists have assumed responsibility. It is up to them to see that it is salvaged. For example, the dams on the Missouri will create enormous reservoirs flooding the heart of the Mandan, Hidatsa, and Arikara country. Once the reservoirs are filled it will not be possible to recover the history of these peoples. Projects in Kansas, Oklahoma, and adjacent regions threaten to obliterate the major portion of the evidence of the prehistoric occupation of the Plains. This comes at a time when the importance of the prehistory of the Plains in relation to that of the rest of the country is just beginning to be realized. In other regions the story is similar. We will lose important data concerning the Southeast, the lengthy occupa-

tion of the Northwest, and unknown eastern prehistory such as that of Virginia. Proposed constructions threaten to prevent the continuation of important work which has either just begun or which is under consideration. It is obvious that the filling of the numerous reservoirs will render impossible the securing of adequate knowledge concerning the prehistory of North America.

We were astonished to learn that the Federal program was an old, well established one. It was not based upon fluctuating political or economic theories, for it was developed in agencies which had been created long ago by law. The activities of these agencies are subject only in a relatively minor way to changes in current ideologies. In many cases studies of river valleys had been completed, and authorizations for the dams had been made by Congress ten years ago or more. Actual work on specific projects was held up by the war. Construction can begin at almost any moment; it awaits only appropriations, in fact some funds have already been provided. If we were to salvage the archaeological materials, it was necessary to get to work at once. In order to inaugurate a program permitting the recovery of archaeological materials, it was necessary to develop a means whereby the field of anthropology could express itself; to present its needs to those who were in charge of the program. The Committee for the Recovery of Archaeological Remains was formed for this purpose and it held its first meeting in May, 1945.

The objective of this Committee is to make certain that archaeological remains threatened with destruction are preserved. This means not only excavation but also publication. The Committee believes that preservation includes complete and permanent documentation of all aspects of the process of collection and preservation together with published synthesis and interpretation of the data. These aims necessitate the development of projects which permit the survey of areas, the excavation of important or key Indian villages or other sites, the institution of laboratories and other repositories, and the publication of the results.

Previous large scale archaeological undertakings by the Federal Government have been for the primary purpose of work relief. The River Valley program, as conceived by the Committee, is not another Works Progress Administration. This time, archaeology stands on its own feet, the only objective being the scientific one. It is not encumbered by relief problems or any other unrelated condition. The work must be done because it is essential that a large amount of scientific excavation, analysis, and publication be accomplished before it is too late—before the sites are covered with flood water.

It has been obvious from the beginning that the ways and means by which a program could attain the objectives would be complicated. There is no precedent which the Committee can use as a background for the new program. It is apparent, also, that the size of the undertaking is so great that no existing institution can handle it without assistance from the Federal Government. Even before the Committee was officially formed the aid of Federal agencies was enlisted in order that archaeological work in the river valleys might proceed. In addition to making such work possible, it was believed that since this work was one part of the over-all plan to develop all resources of the valleys, Federal funds could be used for the archaeological work. The various agencies have been extremely cooperative so that now archaeological work is established as a definite part of the program. Funds for preliminary work have become available and other sums will be provided within certain limits. We must realize, however, that even a combination of Federal agencies cannot do the whole job. The cooperation of the archaeological field is essential. It is particularly necessary that local organizations take part in the program. In other words, the groundwork for a large cooperative scheme has been laid and the opportunity for everyone to pull together has been supplied. The responsibility for the success of the whole program rests squarely upon the shoulders of American archaeologists.

One of the first problems which the Committee had to face was the development of an organization to provide necessary direction and supervision on a high administrative level. The work of the Planning Committee had shown conclusively that archaeological work sponsored by Government agencies must be subject to close supervision. This includes the institution of adequate standards, the writing of job qualifications, and the regulation of the whole program in order to assure maximum results from both the practical and scientific point of view. The latter includes, of course, final and complete publication. The first thing necessary was the acceptance of full responsibility by an

agency and the appointment, by that agency, of a man who could administer the program so as to produce the maximum results. The Smithsonian Institution was the agency which logically could assume charge. However, for various reasons, this institution could not take responsibility without aid from other sources. After a number of conversations, a series of inter-agency agreements were made so that now the National Park Service, the Bureau of Reclamation, and the Corps of Engineers will cooperate with the Smithsonian Institution in expediting archaeological programs in areas to be flooded by the building of multi-purpose dams. Dr. Frank H. H. Roberts, Bureau of American Ethnology, Smithsonian Institution, has been given charge of the archaeological work.

The Committee is concerned with the details of organization of the projects, the financing of them, and so forth, only in so far as such features affect the scientific work. The Committee is attempting to represent the archaeological field and it asks of every archaeologist his cooperation and advice. The Committee is in a position to present to government agencies concerned with the development of the river valleys the needs of the archaeological field. This can include not only scientific problems but also opinions and advice dealing with the development of efficient projects. We know from experience that the government desires to develop the valleys to the fullest possible extent. Suggestions, opinions, ideas, and criticisms will be gratefully received by everyone involved.

Archaeological projects are underway in the Missouri and Etowah River valleys, others are about to be inaugurated. These projects are parts of the larger program which has had an interesting development. When we first discussed the problem, it seemed possible that the various river valleys would be organized under a scheme modeled after the Tennessee Valley Authority. An attempt was made to arrange a program which could eventually be fitted into such an organization. However, present consideration of river valley authorities by the government is restricted to informal conversations; pending bills are inactive. Now the work in the river valleys is being carried rapidly forward by regular, well established Government agencies, such as the Corps of Engineers and the Bureau of Reclamation. Existing laws require that the interests of other agencies such as the National Park Service be recognized. Inter-agency agreements include the archaeological interests of the Smithsonian Institution. It is, therefore, necessary that the archaeological program be instituted in a manner which can be fitted in to the procedures of the several agencies. In addition to this, the National Park Service has a fundamental interest in archaeological work through its concern with history and also because it has charge of recreational facilities, including museums, in the reservoir areas. Because of this situation, arrangements authorizing archaeological work, and the funds making the work possible, come through these various agencies to the Smithsonian. The features of this will be explained by others on this program.

One of the prime necessities is the need for cooperation between archaeologists and the agencies furthering the work. This must not be restricted to cheering on the Committee, it must be shown by actual work on the ground. It is too much to expect the Federal Government to inaugurate and subsidize all archaeological work during the next twenty-five years or more. In fact, this would be an unhealthy thing. What is important is that archaeologists should recognize that the Federal Government, through the various agencies, is doing what it can. Archaeologists and their institutions should aid by adjusting their present projects so that they can be coordinated with the work in the river valleys. As the present program enlarges and settles down, increasing amounts of money will be spent on the survey, excavation, and study of archaeology. However, at no time is this amount of money going to be sufficient for the needs. Unless local institutions will concentrate their attention upon lands to be flooded, much will be lost. It is even probable that those in control in Government will lose interest if they find that the archaeological field as a whole will not back up their efforts with actual accomplishments. It will be possible in many instances for private or state institutions to make cooperative agreements, through the Smithsonian Institution, so that archaeological work which must be done, can be done quickly and as efficiently as possible. The purpose of the endeavor is to preserve archaeological materials; there is no intention of taking them out of the region in which they are found. The Smithsonian, particularly the National Museum, will be interested only in type collections. Outlet for publication will be supplied in so far as is possible. For the most part the specimens

obtained during the course of the work will become the property of the institution which, through some arrangement, aids in their recovery.

One inevitable result of the development and expansion of the program will be the demand for trained archaeologists, particularly those to take responsible positions. At the moment, when the program is barely under way, it has not been possible to obtain the services of enough properly trained men. The character of the training is important. It will be advisable to emphasize the broader aspects of American archaeology for the specialized work in river valley archaeology will differ somewhat from traditional procedures. In the past, archaeological projects have been developed around the available supply of scientific personnel. These have also dealt with problems which were largely the concern of a few individuals. Now we are confronted with a very different situation. Not only are current problems involved but we will be forced to deal at one time with all known problems plus those which may arise in the course of the work in any given region. Students must be so trained that they will be able to recognize and handle the situations as efficiently as conditions permit.

Another extremely important aspect of the training of archaeologists is the need for them to know how to handle administrative and labor problems. In other words, archaeologists should be practical anthropologists as well as archaeological specialists. No matter what course the program may take it will involve various institutions cooperating with one or more Federal agencies. We hope that administrative procedure can be simplified and also put in the hands of persons versed in such work but in any case, archaeologists will have to assume considerable responsibility for the execution of their projects. An archaeologist should realize this and be prepared to discharge his duties completely and efficiently in much the same way as a small business is run. Another factor is the relation of the archaeologist to his colleagues and with the labor he retains. It is well known that some projects have not produced as much as they should because the man in charge did not realize the importance of labor relationships.

In summary, archaeologists are responsible for collecting and synthesizing the data concerning the prehistory of North America. The program of reservoir construction which threatens to obliterate a large amount of this data makes it necessary for archaeologists to make a concerted effort to salvage as much as possible. The means by which this may be done are being developed through cooperative agreements between Government agencies and private or state-owned institutions. It is necessary that archaeologists cooperate to the fullest extent of their ability in order that this program may attain its ultimate objective, that is, the production of the maximum scientific archaeological results.

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THE ROLE OF THE NATIONAL PARK SERVICE IN RIVER BASIN ARCHAEOLOGY WITH PARTICULAR REFERENCE TO INTER-BUREAU AGREEMENTS

The role of the National Park Service in river basin archaeology can best be presented by outlining, very briefly, the activities of the National Park Service in the field of archaeology and by pointing out how the river basin studies fit into the Park Service program.

The National Park Service is a land administering agency. It has in its custody areas that have been set aside because of outstanding scenic, scientific, historic, or archaeological significance. Seventeen monuments of archaeological interest have been established pursuant to the Antiquities Act of 1906 which is the basic authority for the preservation of archaeological remains on Government lands. Many anthropologists have conducted archaeological investigations on national monuments under permits issued by the Department of the Interior. Incidentally, the Antiquities Act of 1906, which, in the first instance, was sponsored in a large measure by archaeological societies, has in recent years been under attack by selfish interests. These attacks will no doubt continue in the future, and eternal vigilance is required to prevent abolishment of the act.

In addition to the administration of established areas, the National Park Service is concerned with the investigation of potential areas that might be added to the National Park System. Congress, in 1935, passed the Historic Sites Act, which authorized the National Park Service to "Make a survey of historic and archeologic sites, buildings, and objects for the purpose of determining which possess excep-

tional values as commemorating or illustrating the history of the United States." Only limited funds, however, have been appropriated to carry out the nation-wide investigation of archaeological sites, and during the war this activity was discontinued entirely.

It was during the war, however, when large scale reservoir projects were being planned for the major river basins in the country, that the need for a systematic inventory of the archaeological resources became especially apparent. The prospect that important scientific records would be irretrievably lost before anyone had a chance to examine them was alarming. Fortunately, the National Park Service had another string to its bow. It was engaged in another activity which made it possible to further the archaeological program in river basins even though no funds were available for the Archeologic Sites Survey. In 1936 Congress enacted the Park, Parkway, and Recreational Area Study Act, which authorized the National Park Service to cooperate with and assist Federal and state agencies in gathering data and planning for recreational facilities.

The Corps of Engineers and the Bureau of Reclamation, the agencies engaged in the construction of dams, asked the National Park Service to make studies of the need for recreational facilities in connection with reservoir projects. These agencies viewed recreational facilities as a means of providing additional economic benefits to the community and region affected by the construction of dams. The Bureau of Reclamation and the Corps of Engineers advanced funds to defray the expense of making recreational surveys, and the National Park Service entered into agreements with the Corps of Engineers and the Bureau of Reclamation to make such recreational surveys.

Now, as to the meaning of "recreation," the National Park Service has always interpreted the term in its broadest sense. To them it means not only physical recreation, such as swimming, boating, camping, and hiking, but also cultural recreation, such as viewing historic houses, examining artifacts, and inspecting archaeological features. Archaeological surveys, therefore, have been included in the recreational study of river basins.

To handle the archaeological phases of the extensive recreational study, the National Park Service called upon the Smithsonian Institution because that agency had both facilities and personnel. An agreement between the two agencies was entered into in 1945, and, according to its terms, the Service agreed to furnish the Institution with information on the location of all proposed dams and reservoirs. The Smithsonian Institution agreed to advise on the location of known archaeological and palaeontological sites and to recommend such surveys in the field as seemed desirable.

The National Park Service, in making plans for the development of proposed recreational areas, agreed to include museum and laboratory facilities if the areas were near important archaeological or palaeontological sites. The Smithsonian Institution agreed to advise as to the size and nature of such laboratories and exhibit rooms. The Institution has first selection of any archaeological and palaeontological materials uncovered that have research value. A duplicate collection, where collections permit, will be retained at the local museum building, and any surplus material may be sent to other museums or institutions that have been jointly recommended by the Smithsonian Institution and the National Park Service. The Service prepared budget estimates and received funds which were transferred to the Smithsonian Institution to carry out the work.

There is one other phase of the recreation study of river basins with which the National Park Service is concerned, and that is the possible future administration of some of the developed recreational areas. In a number of cases, after recreational facilities have been planned the National Park Service has been directed to develop and administer those recreational areas. Consequently, the Service is concerned with the careful evaluation of all recreational aspects so that utmost care is exercised in proposing recreational developments.

To summarize briefly, the National Park Service has entered into cooperative agreements with the Corps of Engineers and with the Bureau of Reclamation to make recreational studies of reservoir projects. Archaeological surveys have been included in the recreational studies, and the National Park Service has requested the Smithsonian Institution to participate with the Service in the study. When this request was made, the Smithsonian staff readily perceived the great need and the great opportunities and have gone forward with the archaeological work.

HERBERT E. KAHLER
National Park Service
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THE "HEAD OFFICE" IN THE SMITHSONIAN INSTITUTION AND COOPERATION WITH STATE AND LOCAL INSTITUTIONS

Preceding papers give sufficient background for an understanding of the problems raised by the river basin programs of the Bureau of Reclamation and the Corps of Engineers and further comments along that line are not necessary at this time. In passing, however, it will be well to call attention to the size of the task confronting American archaeology by pointing out that 589 flood control, irrigation, and other type projects have already been authorized in various parts of the country and many more are either proposed or in the tentative planning stage. In a great majority of cases archaeological or palaeontological remains are involved and must be taken into consideration. Because these discussions are before an anthropological group most of the stress is on archaeology, but palaeontology is very much in the picture and can not be overlooked. Provision is being made for work in that field also.

The Smithsonian Institution's plans for the River Basin Surveys—based on the preliminary plans developed by Dr. Waldo R. Wedel and his associates in the Missouri Basin and expanded to fit the needs of the program as a whole—call for the fullest possible recording and salvaging of archaeological and palaeontological remains located within and immediately adjacent to the boundaries of authorized and proposed reservoir sites and such areas as may be disturbed by the construction of canals, irrigation ditches, or other activities that will change and modify the existing terrain. The program provides for:

1. Preliminary surveys to locate all possible remains within specific constructional projects.

2. Limited test-excavations to determine which sites appear to be of prime importance.

3. An intensive follow-up of extended excavation at those sites whose size, comparative richness or uniqueness, depth of overburden, historical position, representativeness of a locality, or other characteristics promise particularly informative results in relation to the archaeology of neighboring districts and of the particular area as a whole. Such sites are to be chosen with great care as it will be possible to excavate only a small percentage of all that will be destroyed.

4. Establishment of field offices and laboratory facilities where specimens can be processed; maps, field notes, and other records be held on file; and analytical work be carried out for the preparation of full technical reports for publication.

5. Publication of the completed scientific reports in one of the regular Smithsonian publication series, probably the *Bulletins of the Bureau of American Ethnology*, and permanent filing of the basic records at the Smithsonian Institution where they will be available for reference purposes.

6. Deposition in the U. S. National Museum of type series of specimens from each project, other series being placed in such recreational area exhibits as may be established and the remainder in state and local institutions and museums.

Whenever possible members of the Smithsonian Institution's various anthropological staffs will be used in this program. More personnel will be needed, however, and professional workers will be recruited and appointed under the Civil Service Commission's rules and regulations. Field assistants, expert labor, and ordinary labor will be hired for shorter periods without recourse to the Civil Service Register. As far as practicable, students and graduate students will be given an opportunity to join the field parties in the capacity of laborers and supervisors during their vacation periods.

In carrying out the River Basins program it is the full intention of the National Park Service and the Smithsonian Institution to encourage the participation of State and local organizations. It should be apparent that the work of all will be needed and that there should be no holding back by those in a position to assist. It will not be possible to transfer Federal funds for cooperative work but where competent local personnel are available they will be utilized, as previously mentioned. Also, whenever practicable, the investigation of particular units in the program will be turned over to qualified local agencies having sufficient staff and funds to carry on such work. As a matter of fact it is urged that such organizations adapt their plans to encompass that kind of activity. This will permit the Federal efforts to be concentrated on other deserving projects. Such a procedure has already been followed in a number of cases with mutually satisfactory results. However, it is essential that direction of the recovery program be retained in a single agency—in this instance the Smithsonian Institution—in order that the fullest coordination of effort may be carried through on a nationwide scale. Because the scientific problems, like the overall plans for river development, transcend state and regional boundaries, all local projects should be cleared through the central office in order to prevent duplication of effort and ensure a well integrated series of investigations.

A brief summary of activities and procedures to the present will serve to explain the manner in which the surveys have been started, to illustrate various forms of cooperation, and to indicate the results being obtained. As soon as the memorandum of understanding between the National Park Service and the Smithsonian Institution had been signed by the respective heads of those agencies and had been approved by the Secretary of the Interior, October 9, 1945, the Smithsonian was furnished with lists of Bureau of Reclamation and Corps of Engineers top priority projects. On the basis of these lists it was possible to determine the areas calling for immediate attention. Because of the size of the Missouri Basin, the 105 projects already authorized and in many cases under construction there, its importance to American archaeology in general, and the fact that very little was known about most of the region, it was given first attention. The organization of the Missouri Basin Surveys was entrusted to Dr. Waldo R. Wedel, Associate Curator, Division of Archaeology, U. S. National Museum, who was detailed to the Basin Surveys Project for that purpose. Dr. Wedel made his plans, assembled personnel, and took to the field in July of 1946. It is not necessary to consider that phase of the work further here as Dr. Wedel's report appears below. While this was being done letters were written to universities, museums, and local archaeological and historical societies in other regions where work is contemplated. They explained the proposed projects and asked for information about the presence of sites in areas to be flooded or otherwise damaged. Members of the Bureau of American Ethnology staff searched the literature for references to sites or other archaeological manifestations in such regions and from this data and the replies to the letters of inquiry it has been possible to determine where surveys should be started and in some cases, even, to prepare estimates for actual excavation programs.

Information secured during the Archaeological Survey of Georgia in 1939 was made available for the portion of the Etowah River that will be flooded by the Allatoona Reservoir, Dr. Robert Wauchope turning over his notes and map to Dr. Gordon R. Willey of the Bureau staff when he went to the reservoir site in February, 1946 to check on the need for additional examination of the area. Dr. Willey was unable to complete his investigations because of previous commitments in Peru and the Wauchope material, with such additions as he was able to make, was subsequently turned over to Joseph R. Caldwell, Division of Archaeology, U. S. National Museum, who was detailed to the River Basin Surveys and is at present continuing the survey on the Etowah. Mr. Caldwell has prepared a brief report of his activities which appears in following pages; hence further comment is unnecessary.

C. E. Schaeffer of the Pennsylvania Historical Commission obtained data on river projects in Pennsylvania and outlined a salvage program for the Allegheny Valley. This was supplemented by estimates for the excavation of sites in the Kinzua Reservoir basin prepared by Wesley L. Bliss, who later became a member of the Missouri Basin Survey staff. Alex D. Krieger of the University of Texas supplied helpful information from the files at the University and from his own field notes about sites which will be involved in the projects on several of the streams in Texas. He also made special trips to some of the reservoir basins to verify the data and locate additional sites and drew up estimates for the cost of excavation for some of the more important ones. This saved considerable time and trouble in the "Head Office." Dr. Theodore D. McCown of the University of California prepared a comprehensive statement on the situation in California which contributed materially in the preparation of preliminary plans for investigations in that state. Dr. L. S. Cressman of the University of Oregon spent considerable time conferring with Corps of Engineers personnel and in obtaining data relative to the Columbia-Snake program. These were sent on to the Smithsonian Institution, where they were put to good use in calling attention to the need for surveys in that region. Prof. T. M. N. Lewis of the University of Tennessee has contributed information about proposed reservoirs in Tennessee and Kentucky and through the cooperation of the Tennessee Valley Authority was able to survey two reservoir basins in eastern Tennessee. Fortunately from the River Basin Surveys' point of view, in neither case will archaeological remains be inundated.

In some parts of the country local institutions already have taken over part of the work. The Ohio State Archaeological and Historical Society, the Ohio State Museum, volunteered to make surveys of the Dillon Reservoir basin on the Licking River and the Delaware Reservoir on the Olentangy River. The Delaware Reser-

voir survey, conducted by Richard G. Morgan and Raymond S. Baby, was completed in the summer of 1946, while the Dillon is still under way. In Missouri Carl Chapman, Director of Archeological Research at the University of Missouri, and Mr. Haslag, Missouri Resources Museum, assisted by several members of the Missouri Archeological Society, have taken over the task of investigating that portion of the Bull Shoals Reservoir basin, on the White River, lying within the state of Missouri. The dam and some of the reservoir will be in Arkansas and other provision will need to be made for that portion. Chapman and his associates have covered about half the basin on the Missouri side locating forty-five sites of which they believe eight unquestionably call for excavation with four more only slightly less important. These surveys are to be continued next summer. In Kansas Dr. Albert C. Spaulding, University of Kansas, has offered to assume responsibility for a reconnaissance in the Fall River Reservoir basin, a project in southeastern Kansas outside of the Missouri Basin, and also hopes to take over and excavate some of the sites in the Kanopolis Reservoir, one of the Missouri Basin units. The University of Oklahoma is planning surveys for several districts in that state, the work to be under the general supervision of Dr. J. Willis Stovall, Director of the University Museum. Dr. Arden R. King, University of Washington, has been conducting surveys along the Columbia below the Grand Coulee Dam in a section which will be flooded by the erection of a dam at Foster Creek. This work is to be continued as a program of the University and will be expanded into other districts but on the basis of reports from there it is evident, as in some of the other states, that the River Basin Surveys will need to provide additional parties.

Another type of cooperation is that furnished by the University of Nebraska in making available space for a field office and laboratory for the Missouri Basin Surveys. Because an excellent library and professional consultants well versed in the problems of the Plains are readily available and because it is only a short distance from Lincoln to Omaha, where the regional offices of the National Park Service and Division offices of the Corps of Engineers are located, this arrangement has been extremely helpful. Without such convenient headquarters the field parties could not have functioned as efficiently as they did. Just what this cooperation may mean to the University of Nebraska is a question which will be answered by Dr. John L. Champe, Director of the Anthropological Laboratory of the University, in his paper which follows Dr. Wedel's. Dr. C. Bertrand Schultz, Director of the University of Nebraska State Museum, has offered the facilities of that institution for the handling of palaeontological material and has cooperated in preparing estimates for the excavation of bone beds known to be involved in some of the reservoir projects. He also expects to be able to take over the responsibility for salvaging specimens from some of the threatened quarries. The Alabama Museum of Natural History has extended an invitation to the River Basin Surveys to make use of its office space and laboratory facilities and in addition David L. DeJarnette, Curator, has placed at the disposal of the men who will be working in that area all of the extensive notes, maps, photographs, collections, etc., resulting from the Statewide Archaeological Survey carried on under the Tennessee Valley Authority and the Works Progress Administration. Needless to say full advantage will be taken of this generous offer as soon as investigations are started in Alabama. Numerous other individuals and institutions have aided in getting this program under way and although they are not specifically named, because of lack of space, their contributions are fully appreciated.

The current status of the River Basin Surveys may be summed up, in closing, by saying that the program is already going ahead in the Missouri Basin and in the Allatoona Reservoir. It is expected that another survey will be started soon after the first of the year at the Buggs Island Reservoir on the Roanoke River, Virginia-North Carolina. A reconnaissance of several projects in eastern Texas is contemplated for early February, and a series of surveys in the Central Valley of California should be under way early in March. Attention will then be turned to other areas and as the program develops members of the staff of the Bureau of American Ethnology will be assigned to the regional direction of the work in accordance with their training and experience. Their status will be comparable to that of Dr. Wedel in the Missouri Basin.

The slowness with which the surveys have been started is attributable to a number of factors. Because the program is a cooperative one involving four Federal agencies it has taken time to arrange proper coordination of activities, to clear the channels through which

memoranda, etc., must move, and to secure the funds needed for the work. The latter, of course, has been the major problem. The Bureau of Reclamation and the Corps of Engineers have made certain monies available, but the process of transfer has been slow. Now that the precedent has been set, however, there probably will not be as great delay in the future. One complicating situation that has had a definite part in retarding progress is that of the areal differences in the Regions for the National Park Service and the Bureau of Reclamation and the Divisions for the Corps of Engineers. The Park Service has four regional offices and the Bureau of Reclamation seven, while the Corps of Engineers has twelve Divisions in the United States, each including several Districts. Inasmuch as a large part of the activities of the three agencies are carried on at the regional, division, and district levels it is necessary to maintain correspondence with a large number of widely scattered rather than a few central offices. A project often falls within entirely different regions and divisions, and the headquarters of the agencies concerned are not only in different cities but even in different states. Hence, some of the difficulty in keeping matters straight may be understood. A tremendous amount of correspondence is necessary and because of lack of help this has been a definitely slowing part in the program. This explains why replies to letters frequently take so long and information has not been forthcoming as promptly as desired. It is hoped that this situation will be relieved in the near future by secretarial assistance Up to the present the "Head Office" unquestionably has been the "bottleneck" and no one is more aware of that fact than the writer. However, if any one wants to know more about the program, to ask about projects in his district, to inquire about cooperation, or to find out what is being done in general, the "Head Office" will endeavor to supply the answers, provided too prompt response is not expected.

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THE MISSOURI RIVER BASIN ARCHAEOLOGICAL SURVEY IN 1946

First of the full scale River Basin Surveys to get underway, the Missouri Valley project has devoted the greater part of its 1946 work to organizational activities—the gathering of a staff of trained archaeologists, establishment of field office and laboratory quarters, and coordination of preliminary plans with those of various other Federal and non-Federal agencies. Despite many handicaps and inevitable delays, it is felt that a basic organization capable of expansion as additional funds and personnel become available is now a reality.

Basic to any field research plans on a basin-wide scale is an appreciation of the vastness and complexity of the area involved. The Missouri River Basin comprises approximately 530,000 square miles, or about one-sixth the area of the continental United States. From Glacier National Park in the northwest to St. Louis in the southeast the airline distance is about 1350 miles; from South Park in Colorado to Devils Lake in North Dakota is nearly 700 miles. Including all or parts of ten states and small portions of two provinces in Canada, the watershed is largely plains, but with rugged hilly to mountainous areas in Missouri, South Dakota, and along the eastern slope of the Rocky Mountains. Elevations range from about 400 feet at the mouth of the Missouri to 14,000 feet at the Continental Divide in Colorado. Native floral associations include hardwood forests in the southeast, tall grass prairies and short grass plains in the central parts, sagebrush scrub in Wyoming, and finally the western pine forests of the Rocky Mountains. All this means an area not only extensive, but also with very considerable diversity of environment—and, correspondingly, with a varied ethnography and archaeology.

Within the Missouri River watershed, plans of the Bureau of Reclamation, Department of the Interior, and the Corps of Engineers, War Department, call for construction of more than 100 multi-purpose dams and reservoirs. Most will be on the tributaries, but with five huge earth-fill structures on the mainstem in South and North Dakota. These latter, some ranking among the largest man-made structures in the world, will create lakes 100 to 200 miles long, inundating long stretches of the river valley. This foredooms to complete destruction numerous Indian village sites in the Dakotas, where the later Upper Missouri aboriginal cultures reached their climax. Tributary reservoirs, though smaller in size, will wipe out a large part of the developmental stages of native culture in the central Plains and elsewhere; and the reservoirs in the westerly and northerly portions of the Basin will similarly destroy significant

chapters in the story of the older pre-pottery and palaeo-Indian groups. In short, the comprehensive developmental program now in prospect threatens wholesale destruction of great portions of the historical materials left by native man during thousands of years of development in the region; and only a similarly comprehensive and unified program of archaeological research can salvage a meaningful part of the threatened information. Important palaeontological localities will also be flooded, and thus come within the purview of the salvage program.

The program envisioned by the Smithsonian Institution for the Missouri River Basin has for its primary objective the fullest possible recording and salvaging of archaeological remains located within, and immediately adjacent to, the boundaries of authorized and proposed reservoir sites. Such a program must provide for (1) establishment of field office and laboratory facilities where specimens can be processed, maps, field notes, and other records held on file, and analytical work carried out for the preparation of full technical reports for publication; (2) preliminary surveys to locate all possible antiquities within specific reservoir units; (3) limited test-excavations to determine which sites appear to be of primary significance; (4) a more intensive follow-up scheme of extended excavation at those sites which promise particularly informative results in relation to the archaeology of neighboring districts and of the Basin as a whole; (5) the preparation and publication of complete technical reports and non-technical accounts of the findings; and (6) the proper disposition and preservation of specimens, records, and other basic data that may be collected. On this last point, it is expected that the specimens collected will be divided after they have been studied, with representative collections of type specimens deposited in the U. S. National Museum; another type series will be placed in Recreation Area exhibits where such are established; and the remaining materials will be deposited in various functioning state and local institutions. Basic records of the work will be permanently filed at the Smithsonian Institution, and the completed scientific reports will be published in one of the regular Smithsonian publication series.

Of the above objectives, the first two have been of primary concern to date. Through courtesy of officials and members of the teaching staff of the University of Nebraska, a field office and laboratory were established in July, 1946, in quarters shared with the university's Laboratory of Anthropology. Here a staff of six full-time archaeologists, on temporary Civil Service appointment, is currently working up field studies made during the late summer of 1946. It is contemplated that this staff will be enlarged as needs and means determine; and it is expected that one or more palaeontologists will be added in the near future. The work to date has been financed with funds transferred from the Bureau of Reclamation through the National Park Service to the Smithsonian Institution. These funds are for use on Corps of Engineers projects as well as on those of the Bureau of Reclamation.

Owing to transportation inadequacies, personnel shortages, unfavorable ground conditions, and other factors, fieldwork in 1946 consisted primarily of preliminary reconnaissance. Attention was directed at twenty-eight top-priority Bureau of Reclamation and five Corps of Engineers units. Some of these projects are already in construction status; at others, pre-construction operations are nearing completion. Units visited include three in Kansas, four in Nebraska, two in Colorado, six in Wyoming, four in Montana, six in South Dakota, and eight in North Dakota. In relatively few instances was it possible to inspect the entire future pool area, and longer visits to most of the units are in prospect. Four, and possibly six, reservoir areas showed no promise and will probably not be re-visited. Nevertheless, in the eight weeks devoted to fieldwork, during which period more than 13,000 miles of motor travel were performed, no less than 170 archaeological and palaeontological sites were located. It is expected that more leisurely surveys at a more favorable time of year will disclose an even larger number of additional sites.

The results achieved by the three two-man reconnaissance parties may be very briefly summarized. Wyoming and Montana yielded relatively few pottery-bearing sites, as expected. Very plentiful, however, were boulder circles or "tipi-rings," as well as buried artifact strata exposed by stream-cutting, stone hearths, rock shelters, and bison falls. Several sites scheduled to be re-visited promise worthwhile returns pertaining to pre-pottery and possibly palaeo-Indian horizons. In the Kansas-Nebraska region were found numerous pithouse villages and other remains attributable to Woodland, Upper Republican, and at least two

other little known late prehistoric or protohistoric horizons. A prehistoric shell-bead ossuary near Woodruff, Kansas, at the upper end of Harlan County reservoir, was excavated during November, and test excavations were made at several nearby village sites. In South and North Dakota "tipi-rings" were also plentiful, particularly west of the Missouri. East of the mainstem were pottery-bearing sites, mound groups, and other evidences of somewhat more permanent and sedentary occupations. In this area, units belonging to the far-flung Missouri-Souris project will have to be closely watched as developmental work proceeds, since early remains may be expected to show up as power machinery operations get underway. On the mainstem itself, where several hundred village sites are known to exist, only Oahe, Fort Randall, and Garrison dam sites have been checked; the reservoir areas remain to be surveyed.

Plans for 1947 are, in part, tentative, pending action on fiscal estimates for continuation of the program. Funds in hand, however, will permit further surveys on an intensified basis, with limited test excavations at numerous sites already recorded and at others that will come to light as additional portions of future pool areas are investigated. It is expected, also, that there will be a rather detailed survey of the mainstem in South Dakota, particularly in the Oahe and Fort Randall reservoir areas. This survey is to include topographic mapping of many of the large fortified village sites that characterize the region, but which have in many instances only been sketched; and test-pitting of as many as time and means permit. Completion of this survey, unquestionably a major undertaking, will make possible the selection of a few key sites for future extended excavation. In addition, funds have been requested for excavation at several high priority projects, including Angostura in South Dakota, Heart Butte in North Dakota, and Boysen in Wyoming. If Oahe dam near Pierre, South Dakota, reaches construction status during the coming fiscal year, funds will also be sought for excavations at two large and well-preserved fortified village sites threatened with early and complete destruction in the construction area. It should be emphasized that there will be in general rather less flexibility in the excavation program than in the preliminary surveys, since it is likely that site excavation funds will have to be obtained as a part of the specific project-construction appropriation.

The urgent need for prompt and large scale action by archaeologists in the Missouri River Basin seems obvious enough. There must be no holding back by state, local, and other non-Federal agencies and organizations interested in the preservation of Missouri Valley prehistory, nor any thought that the Federal government should do the job unaided. In several of the states concerned, action has already been started to raise funds, privately or otherwise, to aid in the work, or to reallocate present research and conservation funds. It is the full intention of the Smithsonian Institution and the National Park Service to encourage participation by responsible and qualified organizations, and through the medium of open conferences and frequent discussions to avoid wasteful duplication of effort. Nothing short of immediate action, carefully planned, fully coordinated throughout the region, and executed on a scale commensurate with the basic program of basin development, will enable us to salvage an appreciable segment of the information about to be destroyed.

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THE UNIVERSITY OF NEBRASKA AND THE MISSOURI VALLEY PROJECT

For the past six months, the field office of the Missouri Valley Project, River Basin Surveys of the Smithsonian Institution has been located in the Laboratory of Anthropology, University of Nebraska in Lincoln, Nebraska. This cooperative arrangement was intended to facilitate the early phases of the River Basin Survey of the Missouri River, and like opportunities will be presented to universities and other institutions elsewhere, in connection with the Government's flood control and irrigation projects which extend into every section of the country. For that reason, a brief report of the Nebraska experiment seems timely.

The Corps of Engineers and other Government agencies have been active in the Missouri Valley for some years, and it became apparent, soon after the end of the war, that development of the power and irrigation resources of the Missouri River would not be long delayed. The potential danger to archaeological and palaeontological resources had received considerable publicity through the work of several scientific committees, and plans were worked out to place the control of the archaeological and palaeontological work incident to the Missouri Valley

development in the hands of the Smithsonian Institution. At the University of Nebraska, the possible participation of that University in the archaeological program was fully explored by a faculty committee of four.[4]

The opinions of this committee can be summarized as follows. First, there is full agreement with the published statements that the archaeological and palaeontological remains of the Central Plains are a national asset, unique and irreplaceable. Second, it is clear that the construction of the 105 dams, now proposed for the Missouri Basin, and the various reservoirs, power and irrigation projects which these dams make possible, will bring about the irretrievable loss of a large part of the remains to be found in and on the terraces along the rivers and creeks. Work on many of these reservoirs has begun, and has created an emergency which is immediate and urgent. Third, the University of Nebraska has been a leader in research in the archaeology and palaeontology of the Central Plains. It accepts its special obligation to act in this emergency situation, and to do everything that it can reasonably do to assist in the recovery of these perishable remains before it is finally too late.

It is clear that the tremendous task of salvaging the materials endangered by the construction of dams within a reasonable distance of Lincoln must involve expenditures of money and professional time far beyond the resources which the University could make available for this research. It was the opinion of the committee, however, that a substantial contribution to the program could be made by placing the technical facilities of the University at the disposal of the River Basin Surveys and by encouraging the Surveys to establish field headquarters on the University campus.

An unusual opportunity for cooperation was made possible by the presence in the Laboratory of Anthropology of the Yale-Nebraska project of the Cross-Cultural Survey. Plans had already been made for reopening this project under the direction of John M. Roberts, Research Associate in the Laboratory and Research Assistant in the Department of Anthropology at Yale. It was easy to turn the attention of this project to a cross-cultural survey of the Missouri River tribes whose remains are imperiled by the construction of the Fort Randall, Oahe, and other reservoirs on the central Missouri River. By the time that the archaeological material is recovered and ready for interpretation all of the major ethnological and historical references on the Missouri River tribes will have been read, abstracted, and filed, ready for whatever use the River Basin Surveys may find desirable.

Six months have passed since the field office was actually established on the campus, and some appraisal of the experiment is now possible. The combined requirements of the Surveys, the Cross-Cultural Survey, and the Laboratory itself have already required a removal of the Laboratory to a new location. The present quarters, in the basement of Love Library, seem adequate for the present, and additional space can be sought when the demands of active field work make it necessary. The adjustment of the procedures of the two institutions has created certain problems. There have been difficulties, but these are anticipated in any such enterprise, and, in retrospect, they seem inconsiderable. Dean Goss, who has been closely associated with the work of several Government agencies on the campus points out that, in his opinion, the River Basin Surveys has proved an exceptionally easy agency to fit into the University picture from an administrative standpoint.

In summary, then, the University of Nebraska acknowledges its obligation to assist in every way possible the recovery of the archaeological and palaeontological remains endangered by the Missouri River development, and it now appears that the most effective means of implementing that assistance is full scale cooperation with the River Basin Surveys of the Smithsonian Institution.

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[4] The committee included Dean R. W. Goss, Graduate College; Dean C. H. Oldfather, Arts and Sciences; Prof. J. O. Hertzler, Chairman of the Department of Sociology and Anthropology; and the writer.

THE ARCHAEOLOGICAL SURVEY AT THE ALLATOONA RESERVOIR, GEORGIA

The Smithsonian Institution, Corps of Engineers, and National Park Service are cooperating in an archaeological survey of the area to be flooded by the Allatoona Dam. The dam is being built by the Engineers at the confluence of the Etowa River and Allatoona Creek just east of Cartersville, Georgia.

The University of Georgia had previously recorded twenty-six sites in the Basin, and an additional fifty-seven have been located during November and December, making a total of eighty-three, most of which will be covered by water. Only a third of the Basin has been surveyed and doubtless many more sites will be found. The famous Etowah or Tumlin mounds are a few miles below the dam and fortunately will not be affected. The survey is determining which sites will be flooded and whether or not some of them should be excavated. As a matter of record, surface collections, notes, and photographs are being made of all sites.

The archaeology of the Basin, as far as it can be interpreted to date, is as follows: The Etowah River and its several tributaries above the dam are bordered by clay hills and spurs, with the bottomlands in some places narrow and in others broad. The inhabitants of the area apparently preferred to live in the bottoms and sites usually occur wherever ground high enough for good drainage is situated close to a stream. The clay hills above were not often occupied. Most sites in the Basin are habitation areas, the most extensive ones being along the Etowah River and the lower reaches of its tributaries. Upstream, toward the headwaters of the tributaries, sites are still numerous but are generally smaller. Burial and domiciliary mounds are rare in the Basin, only two possible examples of the former being known. The Etowah mounds downstream are a notable exception and there is reason to believe that the mound building manifestation there was a relatively late intrusion from the West.

Cultural classification of sites will begin with their ceramic relations since pottery comprises the bulk of archaeological material recovered so far. Stone projectile points are also numerous. It is already possible to correlate some projectile point types with given pottery complexes, and it is hoped that this can be done with other material as well. Some ceramic stratigraphy was obtained by Wauchope during the University of Georgia survey and additional stratigraphic cuts will be made where practicable. We can even now, in a general way, assign many sites to relative chronological positions based on the similarity of their potteries to types which have been stratigraphically fixed elsewhere in Georgia and in eastern Tennessee.

The sites recognized as among the earliest have pottery types variously similar to those of the Candy Creek and Watts Bar foci of eastern Tennessee, the Deptford cultures of the Georgia and northwest Florida coasts, and the early stamping horizons of central Georgia. In the Allatoona Basin the smaller sites in the upper portions of the tributary streams are mainly of this early category. It is also there that stone projectile points occur most frequently. Many of the points are larger than those found at later sites.

Other sites in the Basin show additional pottery types in other combinations. Wauchope's stratigraphy includes several of the later complicated stamped types, including those most characteristic of the Etowah site, and an important problem at present is to trace the development of these types in Georgia. Other late potteries include more than one variety of Lamar Complicated Stamped which was widespread in the Southeast during protohistoric and historic times. The more extensive habitation sites on the Etowah River and its lower tributaries more often show the later potteries, including both the Lamar and Etowah types. Projectile points are much more rare in these later sites but a few workshops have been found suggesting that flint chipping activities were carried out in specialized localities.

The latest pottery found in the Basin can probably be identified as historic Cherokee. We know at least that similar types were being made elsewhere after the Cherokee had driven the Creeks from the Etowah area. The Basin also contains documented Cherokee sites and an attempt is being made to locate them.

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SUMMARY

The papers presented here show the successful operation of the initial stages of the Government archaeological program in the river valleys. The Smithsonian Institution, as the official archaeological agency, is in charge. Frank H. H. Roberts, Jr., has been designated as the administrative head. The program functions through a series of inter-bureau agreements among the National Park Service and the Bureau of Reclamation in the Department of the Interior, the Corps of Engineers in the War Department, and the Bureau of American Ethnology in the Smithsonian Institution.

Field work by Government archaeologists is already under way in the Missouri and Etowah

valleys. Preliminary surveys by state and private institutions have been made in other valleys. The program will be expanded during the next few months and will continue to expand as more and more dams reach the high priority stage for construction.

Several points were raised in the papers and in the discussions following them which may profitably be emphasized in conclusion.

1. Although previous large-scale Government archaeology was for the purpose of work-relief, this time archaeology stands on its own feet. The Committee has found complete agreement throughout the Government that the archaeological sites constitute a great and valuable national resource. The archaeological projects will be authorized purely as scientific expeditions to obtain information important to the public and they will be manned and equipped solely with this end in view, and not to provide jobs or for any other purpose.

2. These plans, in all cases, will include provisions for the publication of scientific and general reports and the Smithsonian Institution has undertaken to see that these provisions are carried out.

3. The amount of work which must be done if only minimum scientific requirements are to be met in salvaging vital data is little short of appalling. The Government can not and will not do it all. The Committee is convinced that, if state and local archaeological organizations will support the program, the Government agencies involved will do their part. The cooperation of all of us will be necessary and various methods by which this can be achieved are being rapidly worked out.

4. One of the most effective means of cooperation in the present stage of the work is through the survey and excavation of sites by local institutions in areas to be flooded. Information concerning these areas and priorities for construction can be obtained from Roberts; members of the Committee for the Recovery of Archaeological Remains; regional offices of the Bureau of Reclamation, the Corps of Engineers, and the National Park Service; and the local press.

5. As more and more of the hundreds of dams already completely planned reach high priority for construction, the manpower problem will become acute, particularly for archaeologists in the higher brackets. In order to meet our scientific obligations we must be prepared to postpone or abandon cherished projects and pitch into work in the areas to be flooded.

6. As the construction agencies proceed to actual work continual vigilance must be exercised to insure the provision of sufficient funds for the archaeological work. As the program is at present organized, expenses for archaeology are listed in the budgets of the individual projects. Expression of public support is essential to insure the inclusion of the necessary funds for archaeology in the appropriations for each project. The marshalling of this public support is another means by which anthropologists can render valuable cooperation.

7. The benefits which state and local institutions will receive from the program are many. The guarantee of publication insures permanent scientific credit. Those institutions which are able to offer the type of cooperation described in Champe's paper will be able, thereby, to increase their significance as regional archaeological centers. Archaeologists with experience in many fields will be brought to the campus and the laboratory. On the more material side, it is hard, as yet, to visualize the number of specimens which will be forthcoming. As Roberts has pointed out, the Smithsonian will wish only small "type" collections. Kahler has stated that the Park Service also will need only small collections for exhibition in those areas where recreational facilities are to be provided. The Bureau of Reclamation and the Corps of Engineers will desire to install small exhibits in their local administration buildings. This covers the interest of the Government in the specimens. The great bulk of them will be distributed among the state, local, and academic museums which participate, in one way or another, in the program.

8. As the program develops in various parts of the country, Roberts will advise resident archaeologists and request data, estimates, and cooperation. However, since priority schedules in the construction agencies are often known in the regional offices and appear in the local press before they can be channeled through to the Smithsonian Institution in Washington, information of scheduled construction may first become available in the field. In such cases archaeologists are requested to initiate action by informing Roberts of the local reports. There are two lines of communication by which archaeologists may keep in touch with developments, seek information, or report local activity: Frank H. H. Roberts, Jr., in charge of the program at the Bureau of American Ethnology, Smithsonian Institution, Washington 25, D. C.; and the members of the Committee for the Recovery of Archaeological Remains, particularly its secretary, Frederick Johnson, at the R. S. Peabody Foundation for Archaeology, Phillips Academy, Andover, Massachusetts.

J. O. BREW
Peabody Museum
Cambridge, Mass.
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DESCRIPTION FOR ARTIFACT ANALYSIS

ANDREW HUNTER WHITEFORD

SUGGESTIONS that archaeologists cease their dalliance with inconsequential minutiae and concern themselves to some extent with conceptualization and problem have appeared a number of times in recent anthropological literature. This injunction is probably justified, and if archaeology is to contribute to our knowledge of the processes of culture and the historical interrelations of peoples it must broaden its scope of understanding and sharpen its tools of analysis. This is not as simple as might be hoped. Critics have supplied an answer in archaeology's defense by way of anticipating and refuting a rebuttal before it was offered. The chief defense has been assumed in advance to be that archaeology is still in the stage in which more data must be gathered before any problems may be defined or comprehensive analyses offered.[1]

The fact that the archaeologist is not more frequently concerned with the larger and more significant problems of anthropological endeavor is due, not altogether to ignorance of their existence, but rather to the fact that he, above all others, realizes and appreciates the inadequacies of archaeological data. No one would be happier than the dirt archaeologist if the data from his analyses were applicable to the solution of the larger problems of culture dynamics. The perspective with which to make valid functional interpretations would be welcomed. No one is more interested than he in the *why* of archaeology—the relationship of the excavated remnant of material culture to the whole life of the people whom it represents, the possibilities of cultural reconstruction and interpretation on the basis of excavated materials. He usually considers the answers to these problems eminently desirable but, being ever conscious of his data and their inadequacies, is forced again and again to a concern with the *what* of archaeology. The evidence recovered by archaeological excavation represents only a fraction of the material culture and an almost infinitesimal fragment of the total culture of the people who occupied the sites. With so few clues the most skillful manipulation of carefully devised analytical tools is required to reach any understanding of the cultural implications involved.

That archaeologists are well aware of these problems is manifest in the increased refinement of methods of excavation and, to a lesser extent, of techniques and methods of laboratory analysis. There has been an increasingly apparent attempt to understand and define the type of information which archaeological data may contribute to cultural reconstruction. The archaeologist is the first to realize that before broad relationships in time and space may validly by presented, or processes of cultural interaction may be defined, the local manifestations must be described, analysed, and understood. What can a general reconstruction for a large area contribute to understanding if it is based upon incomplete, undigested fragments? The desire to deal in broad relationships and conjectures on cultural processes from archaeological data is very frequently thwarted by the realization that there undoubtedly is additional information untapped within one's own material. This tends to force consideration of the larger problems to one side, at least temporarily, while attention is redirected toward an attempt to formulate refined methods of archaeological analysis which will produce more precise (not necessarily more minute) understandings.

The criticism that archaeologists are overly concerned with minutiae may be valid but it has been found again and again that these very details are truly significant. The large body of detailed information employed in ceramic analysis is largely responsible for the successful use of pottery in the definition of prehistoric culture complexes. Even such microscopically minute features as are revealed by petrographic analysis have been proved significant. In the constant search for artifact features which are of cultural significance our present knowledge is rarely complete or precise enough to allow *a priori* judgements on this score. Two groups of artifacts which appear to be archaeologically identical may appear, even upon detailed analysis, to possess a majority of features in common. However, if fifteen characteristics are common to both groups but the sixteenth differs consistently, it may be this single unobtrusive detail which will enable the analyst to

[1] Kluckhohn, 1940, p. 43.

add another clue to the definition of horizons suggested by other materials. Good archaeology is built upon details and one who ignores this necessity, or attempts to circumvent this restriction, is returning voluntarily to the days of Peet, and Squier and Davis.

Artifact analysis is one phase of archaeology which alternately has become immersed in minutiae and then recoiled to an almost insipid level of generalization.[2] At least two generations of American archaeologists have attempted to devise classifications for artifacts. The results, while progressive, have not been generally accepted and new efforts to reach a solution appear frequently enough to elicit a common complaint of "still another classification."

Why this concern with classification? Why have archaeologists devoted so much time and energy to the formulation of related series of categories into which various styles of artifacts might be filed? There are at least two reasons: first, the use of a classificatory scheme has been regarded as the proper method of analysis; second, a classification is usually considered the most lucid way to present artifact types for publication and comparison.

CLASSIFICATION FOR ANALYSIS

Alex Krieger, in his paper "The Typological Concept,"[3] has treated the objections to classification systems in a very satisfactory manner. Among other things he points out that artifact analysis utilizing a classification system requires some *a priori* assumptions: "In arranging and balancing an outline of divisional criteria, it becomes necessary to give preference to some criteria over others; that is, to choose those that are 'basic' for the main division." It is necessary to decide, near the beginning of the analysis, whether to record material, execution, proportion, size, and numerous other features thus recognizing their potential significance.[4] If the collection is small enough, it may be spread out and carefully scrutinized before a judgement is made, but if the collection numbers several thousand pieces, or the types established are to be used in classifying specimens not yet excavated, extensive application of the original classification probably will result in distortion of the data. If, for "practical purposes" or "convenience's sake," it is decided at the outset that the material used in manufacture has no cultural significance and therefore may be ignored, it may be observed later that "Type B7×9" in a certain area is usually made of a particular kind of flint. Inasmuch as materials were not recorded in the classification of the first 1,245 specimens of this type the investigator must either decide that the material-areal-morphological contingency was a product of his imagination, or reexamine the 1,245 specimens of this type, this time considering the material from which they were manufactured. Only in this way can he prove or dismiss the possibility that the materials from which "Type B7×9" are made have areal significance.

Similar situations are potentialities even when the styles, types, or variants (whatever they are called) are determined on the basis of fairly detailed examinations. After analysis has been completed for a number of sites or a large part of the collection, certain occurrences of a type described as "triangular blade with flaring stem and concave base" may suggest that a variant with a particularly long stem is of temporal significance. It is a simple matter to insert a subdivision in the classification which will allow for the pigeon-holing of these particular specimens from this point on, or simply to indicate that this feature (the longer stem) is significant at the site being analyzed. It might even be designated as a new and culturally distinct type; but it is incumbent upon the investigator to reexamine the specimens of this type which have already been handled to determine whether other occurrences of this factor shed further light on the material previously analyzed.

Such simple examples as those presented above are liable to occur in working with very large bodies of material, or in conducting analysis over an extended period. The point (to belabor that already made by Krieger) is simply that the archaeologist engaged in analyzing a large group of artifacts cannot possibly make *a priori* assumptions as to which artifact elements will or will not be of significance in determining cultural, areal, or temporal relations. This, however, he is more or less obligated to do in the application of classification. Analysis on the basis of extensive or

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[2] Our primary concern here is with non-ceramic artifacts.

[3] Kreiger, 1944, pp. 271–88.

[4] Rouse, 1939. Rouse has emphasized the importance of utilizing single or discrete characters in the consideration of types. He has used the term "mode" which might be substituted here where I have used feature, character, or element.

complete detail is absolutely necessary until the point of diminishing returns in their use can be demonstrated conclusively.

A large part of the difficulty and disagreement in the use of artifact classifications seems to lie in a misunderstanding or misapplication of their function. The common idea of a classification seems to be that it may be used for analysis and to define the relationships which the archaeologist is seeking to determine. It frequently is regarded as a tool for analysis—a sort of semi-magic apparatus equipped with interrelated compartments and colored neon signs which will flash on to indicate the temporal, areal, and cultural relationships of the specimens at the instant they are properly classified and disposed of. The "right" classification is sought as the panacea of all difficulties in analysis.

Artifact types or the classification into which they are arranged should emerge from the artifacts which are being analyzed and should reflect their significant variation. If an arbitrary classification is used, many potentially significant details may be lost. On the other hand, the use of an *a priori* classification which includes all possible variations with all the possible contingencies of elements is prohibitively cumbersome. The choice might seem to be a middle ground between classifications which result in innocuous types based upon generalized characteristics or those which result in a plethora of types which are distinguished from each other by slight differences which are frequently insignificant. This choice, however, would leave us with a classification which preserved the evils of both and the virtues of neither.

The desired result might possibly be achieved, not by eliminating one kind of classification or the other, but by using both. Here the detailed classification is used in the first step of analysis and a great number of variants are distinguished. The second step is to test each of these for cultural, areal, or temporal significance and then combine into one type those which are similar to each other and which occur in identical associations. This method is satisfactory if the first step in the analysis is recorded in the catalogue as well as the final type to which the artifact is assigned. It is then possible to re-evaluate any specimen on the basis of details which are not indicated in the more-or-less generalized characteristics used to describe the type. Complete descriptions are thus available for each specimen and the complete range of variation of each element in any type is known exactly.

This approach might seem to solve the problem of artifact classification, but anyone who has attempted to set up the possible variants resulting from the permutations of eight or ten projectile point elements realizes that their number becomes astronomical. Unless one has the time or the disposition for unnecessary work, the classification based upon possible contingencies of elements should not be the primary step in analysis.

If the classification is not the most effective device for the treatment of artifacts in the primary stages of analysis what tools or equipment might be substituted? The answer to this, unfortunately, must be that there are no adequate substitutes. What is needed for this phase of analysis is a terminological system—not a classification, but a descriptive system by which the archaeologist may indicate or describe the various features of the artifacts with which he is concerned. With this accomplished, it would be possible to test the variations of each element, alone and in combination with others, for significance *before* the formulation of a classification or the designation of types. Practically all laboratory analysts have felt the need for precise description, but invariably it has been interpreted as a need for a classification. The classifications or types employed in these cases usually have been used as substitutes for detailed descriptions.

DEVELOPMENT OF THE DESCRIPTIVE SYSTEM

American archaeology is far removed from general agreement on terminology. This was fully demonstrated by the results of the questionnaires circulated by the Committee on Archaeological Terminology appointed by this society. Even in regard to such ordinary, everyday, much handled, much discussed objects as projectile points the lack of agreement concerning the parts to be designated by such terms as shoulder, stem, base, barb, etc. was amazing. Each individual seems to know what he is talking about but no one else can be quite sure. With such a situation, it is certain that there is no broadly established, generally accepted series of terms which can be used in descriptive analysis. Actually the concern with classification and typology, and the belief that these constituted the only working tools has obscured the issue to the extent that many workers have not been aware of this lack or of

the necessity for possessing terminological tools for analysis.

The first step in the laboratory analysis of a large body of artifacts after preservation and necessary reconstruction should be cataloguing. This is particularly imperative where large scale excavations are being maintained and a heavy and continuous flow of materials comes into the laboratory. At the University of Tennessee, where such a situation prevailed, it seemed advisable to design a cataloguing system which would have at least two particular characteristics: (1) be based upon criteria objective enough to be understood and used by personnel untrained in archaeology, and (2) give such a complete and accurate description of each artifact that typing and analysis would be possible from the catalogue card without necessitating the repeated handling of each artifact. These desiderata appeared to be impossible of attainment or at least mutually exclusive, but after a year or more of experimentation, a system was devised which, in many respects but not all, proved successful.

This descriptive system[5] is not presented in the belief that it represents the solution to the problem of description and typology, but only because it was used over a period of several years by a group of skeptical and critical archaeologists for the cataloguing of thousands of specimens, with some degree of success. Some of its shortcomings are recognized: (1) It is frequently more detailed than necessary (but no one knows whether any detail is significant or not until it has been fully tested). (2) It is sometimes quite extensive (but any catalogue description which gives a modicum of information requires some space). (3) It is superfluous for the analysis of a group of artifacts which is small enough to be spread out and thus examined and typed. (4) It practically necessitates some knowledge of statistical procedure or contingency tables in order to make the fullest utilization of the factor data which it produces.

On the other hand it has certain virtues: (1) Its procedure is highly objective. (2) Knowledge of nomenclature of parts of artifacts is not necessary. (3) Description is fairly complete. (4) Description is based upon observation of a considerable number of factors. (5) These factors or elements are usually discrete enough to be treated individually and compared with one another in any contingency. (6) A limited number of terms are employed so that a minimum of memory work is necessary. (7) Great flexibility is possible so that outlines of artifacts may be described in minute detail or generalized. (8) The terms have been reduced to a system of symbols which makes possible the inclusion of extended and detailed descriptions in fairly small space. (9) No subjective judgement as to the possible function of an artifact is necessary.

Extensive use of this system has suggested that it has definite possibilities. We have developed and used it in the stage presented here. Some of the defects have already been indicated and others will occur to the reader, but this approach to artifact description is presented in the hope that some workers who are concerned with description and analysis will examine it and develop it into a completely acceptable and useful tool. Emphatically it is not a classification.

One of the most important points to keep in mind in the consideration of this system is that it is designed to be a laboratory tool and nothing else. Utilization of its terminology in the description of artifacts for analysis does not incur an obligation to use it in subsequent publication. When description and analysis have proceeded to the point where types or styles become apparent and can be treated confidently as proven cultural entities, the description may be dropped and a type name[6] or number[7] adopted. In describing artifacts for publication, the symbol system should certainly not be used and the descriptive system may disappear from view entirely as artifacts are described in other, possibly more subjective, terms for the reader.

Accepting the premise that a complete and accurate description is prerequisite to classification, we must determine the various factors of any group of artifacts which might be defined and described as discrete elements. Taking

[5] This descriptive system resulted from the joint efforts of the laboratory and field staffs of the laboratory of Anthropology, University of Tennessee. The original approach was devised by Madeline Kneberg, J. Joe Bauxar, and Andrew H. Whiteford. Modifications and developments resulted from the use and criticism of the system by: T. M. N. Lewis, Charles Nash, John Alden, Wendell Walker, Chandler Rowe, Douglas Osborne, and Carroll Burroughs. Moreau Maxwell, Robert Bell, and Walter Taylor also have offered suggestions and criticisms.

[6] Krieger, 1944.

[7] Rouse, 1944, p. 202.

chipped stone projectile points as an example, let us see what should be included in their description: (1) material and process of manufacture (industry or execution), (2) the basic shape and possible functional class, (3) details of specialization in shape, and (4) size and overall proportions.

Material and Process of Manufacture

In describing this aspect of the artifact it is necessary (although obvious) to indicate that it is made of stone, that the stone is flint, that it has been manufactured by chipping, and something concerning the quality of execution. The type of stone from which the point is made should certainly be indicated, not only because of the great possibility that it will be significant in areal studies,[8] but also because the nature of the material affects the character of the artifact. Regardless of the skill of the manufacturer, much depends upon the hardness and fracture characteristics of the material; obviously the more silicious flints are better for fine pressure flaking than the various kinds of quartz. The type of material used must always be considered when any judgement is made concerning the quality of manufacture. The latter, on the other hand, must be known when we begin to consider types or to attempt to determine something of the style or pattern which was in the mind of the native when he made the artifact. The form of a point which is well chipped from good material may usually be accepted as reflecting the intentions of the maker. This is not true of a crudely made specimen, whether it is crude because the maker was in a hurry, lacked the necessary skill, or simply could not procure good material for chipping. Whether it be the lack of material, skill, or time, crudely made specimens possess many variations in shape which are insignificant because they are accidental.[9] Regardless of the method employed in analysis a certain amount of subjectivity and archaeological experience is necessary in the treatment of crude specimens.

In attempting to describe the quality of execution in chipped stone some criteria must be established which are constant, objective, and fairly precise. This is extremely difficult, but one attempt to fulfill these demands resulted in the following:

DETERMINANTS FOR FINISHED EXECUTION

Flaking	Almost entirely secondary
Shape	Details distinct, intentional
Edge	Even
Surface	Retouched

DETERMINANTS FOR MEDIOCRE EXECUTION

Flaking	Primary, but partially secondary
Shape	Details fairly distinct, possibly intentional
Edge	Uneven
Surface	General lack of retouching

Two other degrees of execution will, of course, be represented by the extremes in this series, *exceptional* being finer than *finished*, and *crude* lacking even the determinants for *mediocre* execution.

Basic Shape and Functional Class

Up to this point we have said the following about our hypothetical projectile point: It is chipped from flint and well executed (finished). We already know the industry to which the specimen belongs, that it is made of a common material, and that it is made well enough to give some assurance that its shape is the result of the maker's intentions.

It is now necessary to describe the shapes of our artifacts. If we feel secure in making a subjective judgement concerning their functions, we might indicate that they are projectile points. A finer discrimination might be made to designate them as arrow points but there will undoubtedly be hesitation in the case of such forms as Figure 57, *b* which might just as well be a small knife or scraper. If we wish to avoid a commitment concerning function, it is possible to describe them in terms of their geometric shape, calling Figure 57, *a* triangular, 57, *b* ovate, etc.[10] This procedure is largely satisfactory with such simple forms but complications arise in the treatment of those which are more complex. After some work with this approach the group at the University of Tennessee experimented with a different system which is presented here.

The basic shapes of the examples (Fig. 57) are simply indicated as "single tapered" (pointed at one end) and the forms described as follows. Outline is considered in terms of deviation from a longitudinal axis. Inasmuch as the points to be described here are bilaterally symmetrical it will be sufficient to describe only one

[8] Bell, 1942.

[9] Lewis and Kneberg, 1946, p. 109.

[10] Black and Weer, 1936.

side. In Figure 58, line AB is the longitudinal axis and it will be seen that line D is diagonal to the axis, line V is vertical to the axis, and line Dr is (for want of a better term) diagonal-reverse to the axis. Two of these terms are sufficient to describe Figure 57, *a* if we recognize that the sides (or edges) are diagonal to its axis and the base is vertical to its axis. It may then be described as having diagonal sides and a vertical base.

FIG. 57.

The three lines to the right of the AB axis in Figure 58, may also be described in terms of their relationship to it. Line P is parallel, line I is incurvate, and line X is excurvate.

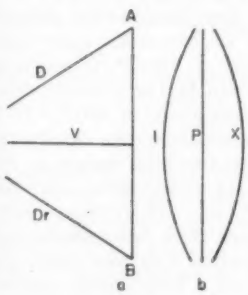

FIG. 58.

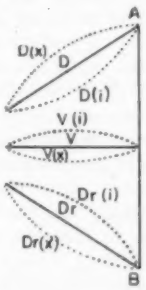

FIG. 59.

Obviously the system so far is inadequate for the description of any of the artifacts in Figure 57 except the first. The addition of two simple terms will greatly increase its efficiency. The designators already given must be assumed to represent straight line deviations from the axis, a limitation which is remedied by recognizing that the path or trajectory of the deviation may be incurved toward the axis or excurved away from the axis. These two terms may then be used to modify the three deviations (diagonal, vertical, diagonal-reverse) and by adding them to our descriptive terms it is now possible to describe the lines shown in Figure 59 in relation to a longitudinal axis. Returning to our examples, we may describe Figure 57, *c* as having sides diagonal (excurved) and base vertical; Figure 57, *d* has the same sides but a base which is vertical (incurvate); and Figure 57, *e* has diagonal (incurvate) sides with a base which is vertical (incurvate). The basic shape of each of these is single tapered.

Up to this point we have described a projectile point such as Figure 57, *d* in the following respects:

MATERIAL AND PROCESS OF MANUFACTURE

Industry	Stone
Process	Chipped
Material	Flint
Execution	Finished

BASIC SHAPE AND FUNCTIONAL CLASS

Functional class	Projectile point
Basic shape	Single tapered
Edges (or blade)	Diagonal (excurvate)
Base	Vertical (incurvate)

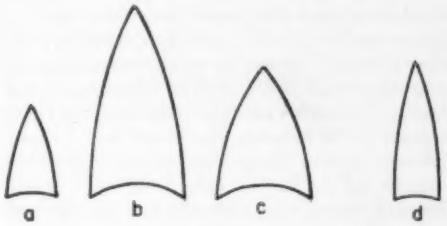

FIG. 60.

Details of Specialized Shape

In such simple unspecialized types as those now being described there are no features which would fall in this category. Its use will be demonstrated later in reference to a more complex description but for the present it may be ignored.

Size and Over-all Proportion

In the description given above the point is fairly well defined but the variants shown in Figure 60, while possessing differentiating characteristics which are possibly significant, would all be lumped together if this same series of elements was used in their descriptions. The two features which distinguish them from each other are size and proportion. Those depicted in Figure 60, *a* and Figure 60, *b* are similar in proportion but differ in size, while those in Figures 60, *c* and 60, *d* are similar in length but differ in proportion. Until analysis has demonstrated that these variations have no significance, they must be differentiated from each other.

In distinguishing variations in size an arbitrary scale is usually devised by means of which projectile points may be graded as small, medium, or large. The divisions used at the University of Tennessee were: small = under 6 cm., medium = 6 to 12 cm. (inclusive), large = 12.1 to 18 cm. (inclusive), very large = over 18 cm. (This is not presented here because it is any better than another scale but simply as a sample for this discussion.) Discriminations in regard to size may be readjusted after analysis has progressed and certain divisions become recognizable as particularly significant or useful.

In our examples, Figure 60, *a* will be distinguished from Figure 60, *b* on the basis of size, the former being designated as small and the latter as large. The criterion of length does not distinguish between Figure 60, *c* and Figure 60, *d* which are the same size; the aspect of proportion of breadth to length must be considered here. This can be done very simply by indicating that the length is equal to or less than the breadth, twice the breadth, three times as great as the breadth, etc. It was found that a different type of designation which defined the breadth in terms of tenths of the length (breadth equals 0.6 of length) was simpler and more effective. This will be dissussed in another section of this paper.

In our description we can now describe and distinguish any of the points so far illustrated. Adding the factors of size and proportion to the information already given, we may further characterize the examples in Figure 60 as in Table 1.

TABLE 1. SIZE AND PROPORTION

	Fig. 60, a	*Fig. 60, b*	*Fig. 60, c*	*Fig. 60, d*
Size	Small	Large	Medium	Medium
Proportion	Two	Two	One	Three

It was found useful at the University of Tennessee laboratory to make an additional observation concerning the thickness of certain specimens. The shape represented in Figure 60, *d* is frequently associated with Middle Mississippi sites and is usually thin in cross section. No scale was set up to designate variations in thickness as this can be considered only in terms of proportion, but particularly thin specimens were specially noted.

Combining the notations on the three descriptive aspects which have been treated here we have the following information on the specimen illustrated in Figure 60, *d*: stone, chipped, flint, finished execution; projectile point, single tapered form, edge of blade diagonal (excurvate), base vertical (incurvate); medium size, length three times breadth, cross section thin.

PROJECTILE POINTS WITH MORE COMPLEX FORMS

Before considering the possible utility of the lengthy description given above it might be profitable to extend one even farther as will be necessary in the description of such forms as stemmed projectile points. Clear and complete descriptions of such artifacts are possible only by the consideration of a number of discrete elements, and it is to this end that classifiers have striven to define such parts as base, haft, neck, barb, stem, etc. The result has been an amazing amount of ambiguity.[11]

The majority of classifications for chipped stone intentionally or otherwise have been based upon Fowke's of 1896,[12] Wilson's of 1897,[13] or that proposed by the Committee on Archaeological Nomenclature in 1909.[14] It is logical to assume that satisfactory description might be possible by ascribing names to the various parts of a projectile point and describing the variations which those parts take in different types. This has been accomplished in a very limited way but there still remains confusion and a very serious lack of agreement in regard to terminology.

Without reference to such terms as shoulder, barb, etc., it is possible to describe varieties of projectile points by application of the terminological system presented here. Those points which consist of something more than a simple blade, i.e. possessing a specialized projection below the blade for attachment to the shaft, may be described in terms of their specializations. For this purpose the third aspect of description, details of specialization in shape, will be reintroduced. This was not necessary in the delineation of the simple points previously discussed.

[11] Committee on Archaeological Terminology, 1942, p. 67.

[12] Fowke, 1896.

[13] Wilson, 1897.

[14] Committee on Archaeological Nomenclature, 1909, p. 114.

Four examples of stemmed points are shown in Figure 61. Each of these could be described in the manner already indicated for unstemmed specimens except for the addition here of two features: shoulders and stem.[15] All these examples have diagonally edged blades. Figures 61, *a*; 61, *b*; and 61, *d* have vertical shoulders while 61, *c* has diagonal shoulders. The relationship of these latter to the axis of the specimen is similar to the deviation of the edge of the blade and therefore may be described by the same term. The edges of the stems are next described: Figure 61, *a* is parallel (a relationship to the axis which has not previously been used, but which is perfectly obvious); Figures 61, *b* and 61, *c* are diagonal; and Figure 61, *d* is diagonal-reverse.

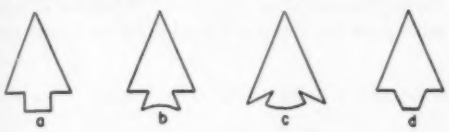

FIG. 61.

The complete description of Figure 61, *c* is presented as an example:

MATERIAL AND PROCESS OF MANUFACTURE

Industry	Stone
Process	Chipped
Material	Flint
Execution	Finished

BASIC SHAPE AND FUNCTIONAL CLASS

Functional class	Projectile point
Basic shape	Single-tapered
Edges (or blade)	Diagonal
Base	Vertical (excurvate)

SPECIALIZATION IN SHAPE

Shoulder	Diagonal
Stem	Diagonal

SIZE AND PROPORTION

Size	Medium
Proportion	Length less than twice width (one)

An additional style of projectile point which must be described in many areas is the side-notched or necked-stem point. In many of these the notch has no consistent form and need not be described except to designate it as a side notch, but in a few exceptional series it might be profitable to differentiate variations. In the two styles shown in Figure 62 it will be seen that the shoulders are vertical and the necks parallel to the axis. In both these cases the lower part of the notch[16] is also vertical but the sides of the stems differ, Figure 62, *a* being parallel sided with vertical base, and Figure 62, *b* being diagonal sided with a vertical (incurvate) base.

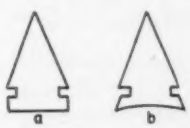

FIG. 62.

A description of the specialized features of Figure 62, *b* would be:

SPECIALIZATION IN SHAPE

Shoulder	Vertical
Neck	Parallel
Step	Vertical
Stem	Diagonal

It should be mentioned that the presentation of such a detailed description as that above does not indicate a belief that all neck-stemmed points should be so treated. However, some exceptionally fine specimens may warrant close inspection and detailed description. In the presentation of any classification or descriptive system the advantage is always with the author for he deals with idealized forms in which the outlines are clearly defined. In reality this occurs in only the most excellently made chipped stone artifacts, the great majority being more or less irregular and difficult to describe or classify under any system. This, however, increases rather than diminishes the importance of a thorough analysis of the better made specimens.

In cataloguing or otherwise treating projectile points it is frequently necessary to deal with specimens in which the blade edge is a double curved or complex line rather than a simple curve or straight deviation from the longitudinal axis. Figure 63 illustrates a few such examples. In both Figures 63, *a* and 63, *b* the deviations of the edge (beginning at the point)

[15] Terminology used follows the suggestions of the Committee on Archaeological Terminology.

[16] Apparently no name has been suggested or needed for this part. We propose to call it the "step."

are diagonal but the course of the former is excurvate-incurvate while in the latter it is incurvate-excurvate. The edges of both Figures 63, *c* and 63, *d* have double deviations. The former is diagonal (excurvate) and parallel; the latter is diagonal, diagonal-reverse.

FIG. 63.

The shapes of all the examples in Figure 63 may be described in the second descriptive aspect (basic shape and functional class) as shown in Table 2.

The most effective results were obtained by dividing the length of the point to be described into tenths and indicating the proportionate measurement of each separate section in terms of these units. The stem in Figure 64, *a* was indicated as one-tenth (0.1) of the total length; the stem in Figure 64, *c* as four-tenths (0.4) of the total length of the point. In comparing Figures 64, *c* and 64, *d*, the shoulders in the former were indicated as one-tenth (0.1 of the length) in depth, while in the latter they were indicated as two-tenths (0.2).[17]

Notations concerning the proportion of parts now makes it possible to describe practically any form. This is well illustrated in the treatment of projectile point styles which possess recurved (or twice modified) outlines such as those illustrated in Figure 65. Again it is possible that the morphological difference between

TABLE 2. BASIC SHAPE AND FUNCTIONAL CLASS

	Fig. 63, a	*Fig. 63, b*	*Fig. 63, c*	*Fig. 63, d*
Functional class	Projectile point	Projectile point	Projectile point	Projectile point
Basic shape	Single tapered	Single tapered	Single tapered	Single tapered
Blade edge	Diagonal (excurvate-incurvate)	Diagonal (incurvate-excurvate)	Diagonal (excurvate), parallel	Diagonal, diagonal-reverse
Base	Vertical (incurvate)	Vertical (incurvate)	Vertical (incurvate)	Vertical

The descriptive system as developed to this point was used in the laboratory at the University of Tennessee to process most of the materials from the Chickamauga Basin. It produced fairly satisfactory results, the major deficiency being a failure to indicate the proportions of the various parts of a point to each other. The importance of over-all proportion (relation of length to breadth) had been realized early in the work but it was found necessary to indicate particularly long stems or shallow shoulders in additional notations if these features were to be retained in the catalogue for the final analysis. Figure 64 illustrates the importance of noting the proportion of parts. The descriptions of these points would not distinguish them from each other unless the proportions of parts were described. In an attempt to rectify this shortcoming in the system it was extended to what may be its logical conclusion: a notation of the proportions of the various parts to the whole was added to the systematic description.

Figures 65, *a* and 65, *b* will have no archaeological significance but there is no assurance that such is the case until they have been distinguished from each other and individually examined in terms of location, associations,

FIG. 64.

distribution, etc. The two forms are quite distinctive but without a notation concerning proportion of parts their descriptions would

[17] The possibility of measuring vertical proportions in tenths of the breadth was investigated but the doubtful advantages were not worth the time to make another decimal division.

have been identical. Figure 63, *a*, which is similar to Figure 65, *a*, has already been described, but to distinguish it from Figure 65, *b*, the proportion of the blade which is excurvate and that which is incurvate must be given: Figure 65, *a*, edge diagonal (excurvate 0.6—incurvate); Fig. 65, *b*, edge diagonal (excurvate 0.9—incurvate). The figures following the modification "excurvate" in each case indicate that that section of the blade edge is six-tenths of the whole in Figure 65, *a*, and nine-

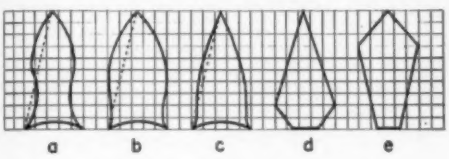

FIG. 65.

tenths of the total blade in Figure 65, *b*. It is not necessary to give the proportions for the remaining part.

The recurved styles are the most difficult to describe accurately. In large specimens where it is advisable to describe the arch of the curvature this may be done by including a second figure to indicate the distance from the apex of the curve to its chord. A low figure will thus indicate a flat curve while a higher figure will indicate a greater curvature. This makes it possible to distinguish between such specimens as Figures 65, *b* and 65, *c*; Figure 65, *b*, edge diagonal (excurvate 0.9, 0.1—incurvate); Figure 65, *c*, edge diagonal (excurvate 0.9, 0.05—incurvate). This device is very rarely used but is included here to illustrate that, within the system, such detailed discriminations are possible if they are desired.[18]

The description of changes in direction of deviation in angular specimens is much more simple. Figures 65, *d* and 65, *e* may easily be distinguished from each other by including the proportion of one of the deviations as illustrated by the following description of their edges: Figure 65, *e*, diagonal 0.3, diagonal-reverse; Figure 65, *d*, diagonal 0.8, diagonal-reverse 0.2. The inclusion of a second measurement after a straight line deviation is possible to indicate the angle of the line from the axis; that is, the second figure will measure the distance from the axis to the end of the slanting line. This is rarely needed but may be included and is sometimes helpful where the first deviation in the description does not constitute the greatest width of the specimen. No such case is illustrated here, but the angle of the diagonal-reverse section of Figure 65, *d* might be indicated by a second figure measuring the distance between the end of the line and the axis of the point.

It might be profitable to review the complete description of Figure 65, *d* as an illustration of the use of this second measurement.[19]

MATERIAL AND PROCESS OF MANUFACTURE

Industry	Stone
Process	Chipped
Material	Flint
Execution	Finished

BASIC SHAPE AND FUNCTIONAL CLASS

Functional class	Projectile point
Basic shape	Single-tapered
Edges (or blade)	Diagonal, diagonal-reverse (length is 0.2 of total, ends 0.1 from axis)
Base	Vertical (extends 0.1 from axis)

SPECIALIZATION IN SHAPE

None

SIZE AND PROPORTION

Size	Medium
Proportion	0.5 (this indicates that the breadth is half the length)

It will be apparent that the details brought together in such a systematic description are not easily translated into a mental image of the artifact. The general characteristics may be perceived in the imagination and the specific elements compared but much of the precision of the system will be lost. The easiest and most satisfactory way to translate a systematic word description into an image is by drawing it. The fact that this approach divides the artifacts into tenths for the indications of proportion of

[18] It might be more efficient to note the type of curvature as flat or high and reserve the use of the second figure to indicate the degree of deviation from the axis where it was necessary. The first figure following a deviation would indicate the length and the second the distance between the terminus and the axis.

[19] This is actually a poor example inasmuch as this specimen would be described more simply by indicating the length of the diagonal deviation and the breadth of the base. In this way there would be no uncertainty about the diagonal-reverse line which would simply connect these two.

parts simplifies the problem of drawing the artifact described. Coordinate paper should be used, and any artifact may be drawn as ten units in length with all parts then measured in terms of these units. The over-all proportions which are given at the end of the written description will prescribe the breadth of the artifact and the boundaries may immediately be established within which the artifact will be drawn. (The drawing is always ten units in length; the breadth is indicated by the proportion number at the end of the description: 0.5 is five units wide, 0.8 is eight units wide, etc.)

The problem of dividing the length of each artifact to be described into ten equal parts was solved at the University of Tennessee by designing a proportion divider which performed this operation at the time the length was being measured in centimeters for cataloguing.

CONCLUSION

In conclusion it should be said again that the point to be emphasized is not the particular method of description but the attempt to *describe each artifact fully in terms of a systematic arrangement of discrete elements.* No analyst can safely assume that certain features of a series of projectile points are going to be of greater significance that others until all have been recorded and the points thoroughly compared and related to the other archaeological materials.

The system is flexible and any feature of a point which the worker wishes to record may be added to the description. Conversely, others may be eliminated from later recordings if it has been satisfactorily demonstrated that they have no significance. Specialized features such as serrations on the blade can be indicated easily in the description of the edge; basal notches can be added to the description of the base; and channels or flutes on the face can be inserted in the section relating to specializations in shape. The same is true of other special characteristics such as beveling, grinding, reworking, etc. Specimens which are not bilaterally symmetrical may also be described by giving the details of both sides; in other words a double description is necessary, one for each side.

The system has been applied to untapered artifacts such as scrapers and other tools of chipped stone as well as to the cataloguing of ground stone artifacts. In making these extensions some modifications are necessary but the basic principles which are presented here have guided the entire approach. Extensive manipulations, statistical and otherwise, are possible with data which are being analyzed in this manner but the material should not be published using the terms of the analysis. Translation into other terms is possible at any stage. Variants may be given type names or numbers; they may be assigned to particular cultures and so labeled; or they may be described by using such terms as stem, shoulder, etc. At this point, however, the analysts have a very precise understanding of the characteristics of the specimens which are being described or combined into a type or class, as well as a critical understanding of the significance of each variation.

APPENDIX

The necessity or at least the desirability of complete artifact descriptions based upon the observation of discrete elements has been realized by most archaeologists but the practical problem of recording has usually proven to be an effective obstacle. Field notation sheets and even permanent catalogue cards, by their limited size, restrict the amount of space which can be devoted to the description of a single projectile point. The difficulties of recording complete descriptions within limited space have been among the important reasons for omitting many details.

The descriptive system presented here does not, in itself, solve the problem of squeezing an extended and complete description into a very small space but another device—one which has long been used in science—was adopted and extensively utilized at the laboratory of the University of Tennessee. This is the substitution of symbols or abbreviations for the terms used in description.[20] At this institution all artifacts were described on 3×5 inch catalogue cards. These were made in duplicate, one being filed numerically by site and the other according to typology. The information from these cards was combined in a number of instances, e.g., each burial card (5×8 inch) carried complete descriptions of all the artifacts which were associated with it. The same thing was done with house cards and other feature cards, and subsequent work demonstrated the utility and

[20] The early stages of this development are described in Lewis and Kneberg, 1939.

value of such operations, which brought together complete information on archaeological materials found in close association.

Two aspects of this particular system lend themselves to description by symbols: one is the systematic and consistent order in which various features of the projectile point (or other artifact) appear; the other is the comparatively small number of terms which must be remembered. Where numbers and letters have been used in other abbreviations, they have usually been in reference to the particular position of the type or variant in a taxonomic system.[21] They have actually been symbols rather than abbreviations. In the approach presented here the shorthand signs are more truly abbreviations and refer only to a single word or term which is used descriptively. An attempt has been made to introduce abbreviations which bear some relation to the word from which it is derived, and which will immediately suggest it to mind. Anything which can be described in words can be described in abbreviations for they are simply substituted for the words. The difficulty is in finding the proper words. Anyone can develop his own series of abbreviations to fit his particular needs so long as it is used with consistency.

A few examples of the application of this system of abbreviations will serve better than any further discussion.

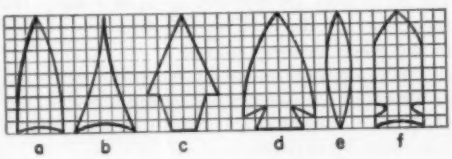

FIG. 66.

FIGURE 66, *a*

Material and Process

Industry	Stone, chipped	Sc
Material	Flint	Ft
Execution	Finished	F

Basic Shape and Functional Class

Functional class	Projectile point	Pj
Basic shape	Single tapered	St
Blade shape	Diagonal (excurvate)	D(x)
Base shape	Vertical (incurvate)	Bv(i)

Specialization in Shape

None	None	

Size and Proportion

Size	Medium	Md
Proportion	Width 4/10 of length	0.4
	Thin	Th

Complete Description

Sc-Ft-F/Pj-St-D(x)-Bv(i) ‖Md-0.4-Th

FIGURE 66, *b*

Material and Process

Industry	Stone, chipped	Sc
Material	Chalcedony	Ca
Execution	Exceptional	E

Basic Shape and Functional Class

Functional class	Projectile point	Pj
Basic shape	Single tapered	St
Blade shape	Diagonal (incurvate)	D(i)
Base shape	Vertical (incurvate)	Bv(i)

Specialization in Shape

None	None	

Size and Proportion

Size	Small	Sm
Proportion	Width 5/10 of length	0.5
	Thin	Th

Complete Description

Sc-Ca-E/Pj-St-D(i)-Bv(i) ‖Sm-0.5-Th

FIGURE 66, *c*

Material and Process

Industry	Stone, chipped	Sc
Material	Jasper	Ja
Execution	Finished	F

Basic Shape and Functional Class

Functional class	Projectile point	Pj
Basic shape	Single tapered	St
Blade shape	Diagonal, 7/10 of length	D0.7
Base shape	Vertical, 1/10 wide	Bv0.1[22]

Specializations in Shape

Shoulder shape	Vertical, 1/10 depth	V0.1
Stem shape	Simple stem, diagonal reverse	(S)dr

Size and Proportion

Size	Medium	Md
Proportion	Width 6/10 of length	0.6

Complete Description

Sc-Ja-F/Pj-St-D0.7-Bv0.1 ‖V0.1-(S)dr/Md-0.6

[21] Finkelstein, 1937; Strong, 1935; and others.

[22] This is half of the total width of the base. Only half the artifact is being described.

FIGURE 66, *d*

Material and Process

Industry	Stone, chipped	Sc
Material	Chert	Ct
Execution	Mediocre	M

Basic Shape and Functional Class

Functional class	Projectile point	Pj
Basic shape	Single tapered	St
Blade shape	Diagonal (excurvate), 9/10 of length	D(x)0.9
Base shape	Vertical, 2/10 wide	Bv0.2

Specialization in shape

Shoulder shape	Diagonal, 2/10 depth	d0.2[23]
Stem shape	Simple stem, diagonal-2/10 long	(S)d0.2

Size and Proportion

Size	Medium	Md
Proportion	Width 6/10 of length	0.6

Complete Description

Sc-Dt-M/Pj-St-D(x)0.9-Bv0.2‖d0.2-(S)D0.2/Md-0.6

FIGURE 66, *e*

Material and Process

Industry	Stone, chipped	Sc
Material	Obsidian	Ob
Execution	Exceptional	E

Basic Shape and Functional Class

Functional class	Knife	Kn
Basic shape	Double tapered	Dt
Blade shape	Excurvate	X
Base shape	None	

Specialization in shape

None	None	

Size and Proportion

Size	Large	Lg
Proportion	Width 2/10 of length	0.2

Complete Description

Sc-Ob-E/Kn-Dt-X/Lg-0.2

FIGURE 66, *f*

Material and Process

Industry	Stone, chipped	Sc
Material	Flint	Ft
Execution	Finished	F

Basic Shape and Functional Class

Functional class	Projectile point	Pj
Basic shape	Single tapered	St
Blade shape	Diagonal (excurvate), 3/10 of length	D(x)0.3
	Parallel, 5/10 of length	P0.5
Base shape	Vertical (incurvate), 2/10 wide	Bv(i)0.2

Specialization in Shape

Shoulder shape	Vertical 1/10	V0.1
Stem shape	Neck stem (side notch), ½/10 of length	(N)0.05
	Step diagonal	D
	Stem parallel, 1/10 of length	P0.1

Size and Proportion

Size	Medium	Md
Proportion	Width 4/10 of length	0.4
	Thin	Th

Complete Description

Sc-Ft-F/Pj-St-D(x)0.3, P0.5-Bv(i)0.2/V0.1-(N)0.05, D, P0.1/Md-0.4-Th

A few comments in regard to the proportion measurements which are given in the descriptions: When the total number of sections which are measured longitudinally equal the total length of the artifact, one (only) of the numerical indicators may be omitted. Thus, when describing a stemmed point with a vertical shoulder, the proportion measurement for the stem may be omitted as it is simply the remainder of the artifact after the proportion of the blade has been given.

The same thing is true in referring to breadth. In describing a point with a parallel stem, the proportion measurement for either shoulder or base may be omitted.

On the other hand, descriptions for specimens in which portions of the outline overlap must be complete, and proportion measurements for all sections must be given. With a diagonal shoulder, the edge of the blade and the stem overlap (their combined lengths being greater than the length of the artifact) so the proportion measurements for both must be given. The same thing is true in regard to width when the specimen has a diagonal stem; proportion measurements for both shoulder and base must be given.

[23] The convention has been adopted of using the lower case letter to indicate deviation in which the distance is measured laterally rather than longitudinally. Thus d0.2 is a diagonal line drawn two-tenths *toward* the axis.

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Beloit College
Beloit, Wisconsin
November, 1946

A NOTE ON CERTAIN MOCHICA (EARLY CHIMU) TEXTILES

LILA M. O'NEALE

DR. Max Uhle's excavations at Moche in 1899 for the University of California yielded a collection of pottery and associated non-ceramic objects that remains the touchstone for Early-period finds from the Northern Peruvian coast.

Moche pottery has been published by Kroeber.[1] The Mochica were imaginative as well as skilled craftsmen, and their ceramics is proof of an ability to express ideas and to handle tools with precision. Distinguishing features of two of the principal types make them readily identifiable: (1) stirrup-mouth and loop-handled vessels decorated with animated scenes mostly painted in fine red outlines; (2) forms representing birds, animals, and humans —some of whom probably were real personages —modeled with regard for characteristic details. Both of these types have been widely distributed to museums and collectors.

Concerning the non-ceramic finds very much less has been published, and of the Mochica textiles almost nothing at all. This deficiency is largely the result of unfavorable soil and weather conditions that materially reduce possibilities of assembling collections of well-preserved cloths comparable to those from other coastal sites. Rafael Larco Hoyle, Director of the museum on the hacienda at Chiclín, "does not know a single whole textile which is authentically Mochica."[2] Bennett's excavations in the Viru[3] Valley produced about thirty fragments,

[1] A. L. Kroeber, "The Uhle Pottery Collections from Moche," *University of California Publications in American Archaeology and Ethnology*, Vol. 21, pp. 191–234, Berkeley, 1925.

[2] A. L. Kroeber, "Peruvian Archaeology in 1942," *Viking Fund Publications in Anthropology*, No. 4, p. 57, New York, 1944.

[3] Wendell C. Bennett, "Archaeology of the North Coast of Peru: An Account of Exploration and Excavation in Viru and Lambayeque Valleys," *Anthropological Papers, American Museum of Natural History*, Vol. 37, pp. 1–153, New York, 1939.

but he, too, expresses doubt if large pieces exist.[4] Thus, since Mochica cemeteries may never yield large textiles, or indeed desirable numbers of any respectable size, it is essential methodically to salvage all fragments that might under other circumstances be overlooked or ignored.

Uhle mentions cloths in only 5 of the 795 catalogue entries for Site F. Fortunately, these textiles were augmented by a much larger number of cloth patches and strands of yarn too insignificant to mention and not infrequently too small to see without a magnifying glass. As the result of systematic search which included handling stone, shell, and bone artifacts in addition to the metals, the textile material comprises eighty-odd specimens.

Copper occurred in more than half of the thirty-three graves in Site F cemetery; silver and gold objects, in fewer. No textiles were found adhering to the gold. Hollow copper objects such as skull covers, masks, veneering sheaths for wooden staves, etc., were made from sheets sometimes hammered out to paper thinness and then given shape over molds. The cast pieces appear most often in the form of heavy oval slugs. There are fifteen of these, and since it was Mochica practice to place a copper or silver disk in the mouth or in the hand of the dead person, such slugs as were found in one or the other position would probably have been in direct contact with cloth.

The recovered bits of cloth in direct contact with metals remain in a state of partial or complete preservation, but even in these instances progressive stages of mineralization are apparent. A very few fragments preserve the original creamy color of white cotton; it sometimes shows up startlingly as in Plate XIV, *a* and occasionally a patch reduced to half its thickness still remains white. More adhering patches of cloth are turning (Pl. XIV, *c*) or have already turned brown (Pl. XIV, *g*), thus making decisions as to whether or not other patches were originally natural brown cotton, pure guesswork. Occasionally, several layers of cloth form a mat which can neither be separated nor successfully removed from the copper. Many fragments or shreds of yarns have to a lesser or greater degree become part of a thin patination (Pl. XIV, *e*), and these vary in color from light green to almost black. For some metal specimens similar to that in Plate XIV, *h* the analysis can record nothing more than the presence of a fabric; for others, 20-power magnification may bring up clearly the reticulations of the fabric but fail to reveal the actual method of warp-weft interlacing. Beyond this stage the metal surfaces have thick sand incrustions which almost bury the fabric. Even where the greater part of the fragment is imbedded or nearly incorporated, it may be possible to observe with an ordinary reading glass the regularly spaced surface lumps indicating the points of intersection of the weaving elements. Obviously, the value of evidence of this nature is limited, but it occasionally offers a clue as to textures, whether close, open, coarse, or fine.

Certain important features of Mochica textiles are not revealed by the fragments in the Uhle series. It is to be hoped that in recent finds from the Viru Valley[5] there are occurrences which will furnish information on the following:

1. *Range in lengths of cloths.* The Site F collection does not contain a single full-length weaving, and only one with an intact corner (Pl. XV, *c*), yet the fragment of loomstring across the end tells us that the Mochica bound their warp skeins to the loom bars and that their webs were individually woven, four-selvaged pieces like those from other coastal sites.

2. *Range in widths of cloths.* The Uhle series contains only one cloth with two selvages (Pl. XV, *d*) although there are almost a dozen fragments with intact bits of one side edge. Not one of these differs from hundreds of other Peruvian cloths I have examined. The Mochica apparently made no effort at reinforcement either by means of oversize edge yarns or by grouping the regular warps. The only feature that distinguished the final fraction of the breadth is the more or less noticeable congestion of warps as the weft draws them in on its turn (Pl. XIV, *b*).

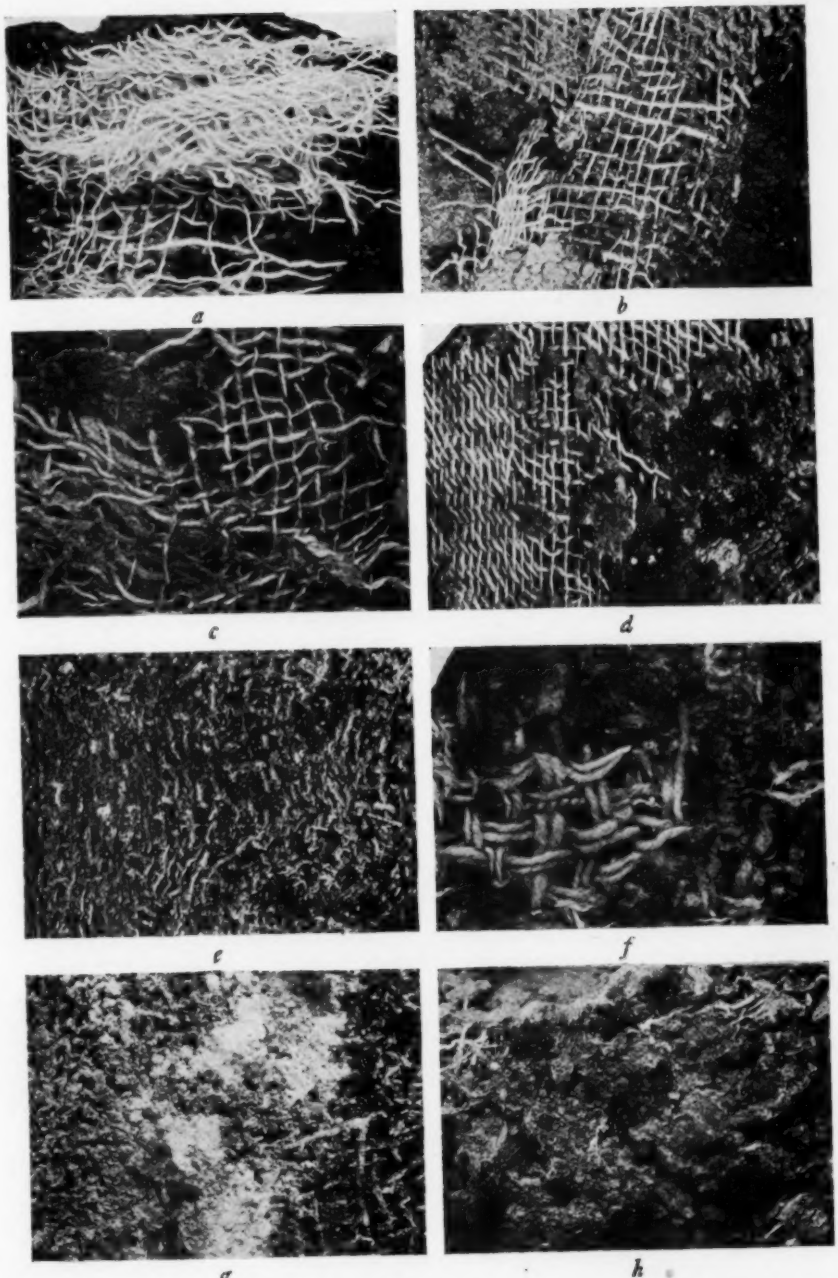
3. *Pattern and color.* Representative specimens to exemplify these aspects are noticeably absent from the Uhle fragments. Even the pottery, lively as it is in incident, is usually developed in red, white, and much less frequently, black.[6] It would seem illogical on the basis of what we know of the Peruvians' love of color to infer that Mochica costumes were prevailingly white or brown as the grave cloths suggest, yet there is only one fragment (Pl. XIV, *b*) that hints at being a dyed fabric. On it there are traces of original (?) orange-red coloring. Kroeber cites information given him by Bennett regarding Doering's recovery of "tapestries, gingham and embroidery from his Mochica levels at La Barranca in Jequetepeque valley."[7] Two of

[4] *Ibid.*, p. 45.

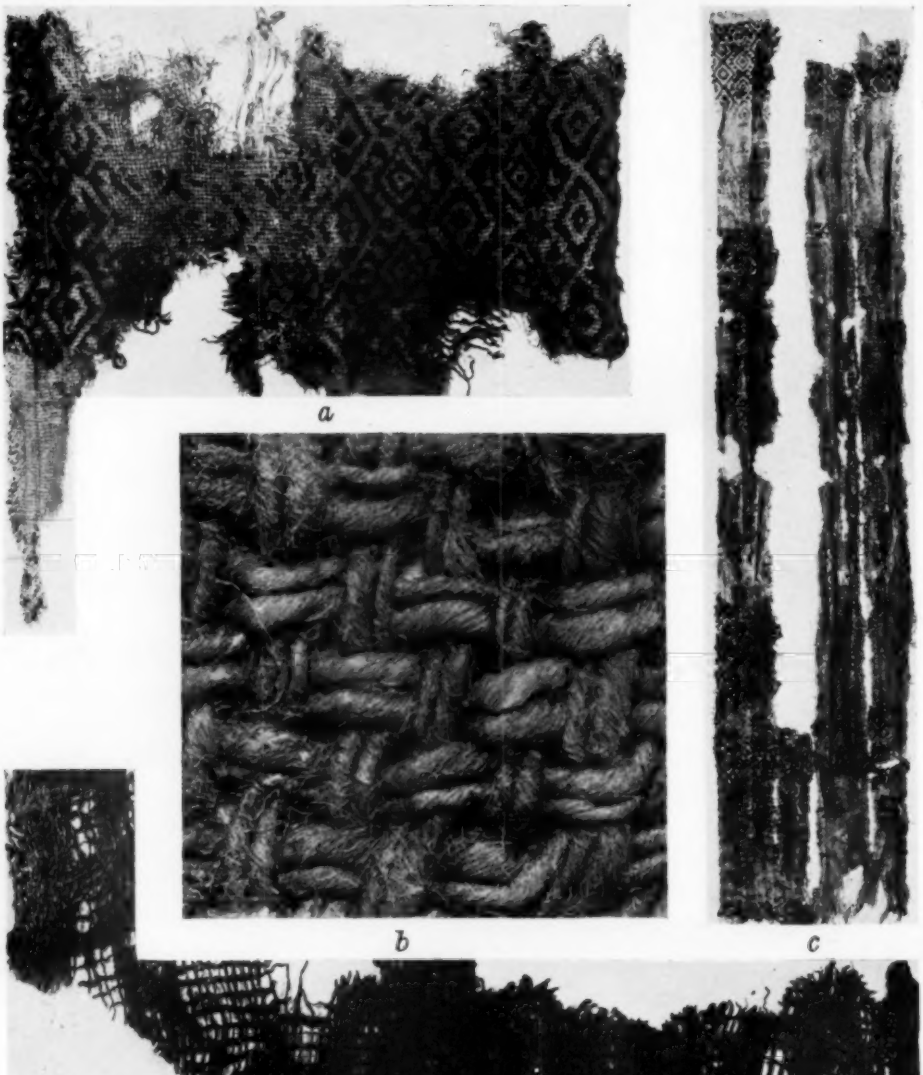
[5] *Ibid.*, p. 46.

[6] A. L. Kroeber, "The Uhle Pottery Collections from Moche," *University of California Publications in American Archaeology and Ethnology*, Vol. 21, p. 199, Berkeley, 1925.

[7] A. L. Kroeber, "Peruvian Archaeology in 1942,"



Textiles in the Uhle collection from Moche. Copper (*b–f, h*) and silver (*a, g*) fragments with cotton textiles adhering to or virtually embedded in the incrustations. University of California catalogue numbers: *a*, 4/3458*a*; *b*, 4/3298b; *c*, *h*, 4/3325a; *d*, *e*, 16/791b; *f*, 16/791a; *g*, 4/3458a.



a *b* *c* *d*

Textiles in the Uhle collection from Moche. *a*, *c*, brocaded cottons; *b*, enlarged section of basket weave; *d*, full-width binding strip. University of California catalogue numbers: *a*, 4/3337c; *b*, 4/2337a; *c*, 4/3337a; *d*, 4/3089e.

the fabrics (Pl. XV, *a*, *c*) are patterned by brocading, but they are so similar in type that they do little more than testify to a confident use of one of the most widely known decorative techniques. The cloths are cotton with pattern yarns of natural dark brown and brick-red dyed wools. Several of the bits of cloth in contact with copper objects have traces of purplish-red wool yarns. Red with a perceptible blue cast is unlike the usual Indian red; perhaps corrosion has influenced the color.

RAW-STOCK COTTON

Patches of loose fluff, the fibers crisscrossed in such a manner as to warrant the opinion that they had never been spun, have been preserved but completely mineralized by their contact with copper. When found adhering to large fragments originally forming copper bowls to cover the face of the dead, the raw stock appears to have been used as padding. In other instances the cotton fluffs may have adhered adventitiously to the many small scraps representing parts of a hollow object held in the hand. To a third type of objects raw stock has also adhered: small folded rectangles of sheet copper, four layers thick; and bits of copper plate, some folded twice. One grave contained a small bunch of brown (?) raw-stock cotton free from the copper fragments.

YARNS AND CORDS

Mochica weavers used cotton alone, wool alone, and the two together in union fabrics. The proportion is preponderantly in favor of the all-cotton materials, but the ratio lacks real significance because it is impossible from the meager fragments to determine how frequently wool might have been combined with cotton for decorative effect. With rare exceptions the ancient Peruvians of all known periods on the coast embroidered and brocaded with colored wools, and it is safe to infer that the similarly brocaded cottons (Pl. XV, *a*, *c*) exemplify standard practice. This inference is supported by the percentages given in a previous study.[8] All-wool materials from Early-period sites at Supe, Paracas, Ica, and Nazca are outnumbered by the cotton-wool unions.

The scanty material from Uhle's Site F makes it advisable to take into consideration every fragment of yarn. In so doing I have examined single shreds projecting from the surface or caught in the incrustation and if there was no near-by patch of woven fabric, have counted them as representing weaving elements. That is, I have arbitrarily assumed that a single crepe-twisted yarn of the type employed for the warps and wefts of cloth indicated the former presence of a textile. Admittedly, some of the shreds might have been elements from multiple-ply cords (specimen 4-3434).

In most of the Peruvian cloths previously examined the warp and weft yarns are medium-to-hard spun. The same is true for the Mochica fragments. The applicable descriptive word or phrase is determined by the number of turns per inch and the resultant angles of twist. If the spinning of a single strand is "soft," long, nearly upright angle lines cross its surface. As the twisting continues, the lines shorten, inclining toward the horizontal. If the turns per inch result in lines angling from about 30 to 45 degrees, the twist may be described as "hard." Hand spinning can produce no yarn with exactly the same number of turns in each section of its length. Although many Peruvian yarns give the impression of absolute uniformity the greater the amount of twisting, the less the impression holds.

Slack-twisted yarns are not found among these Mochica textiles. Sections of spun yarns have been loosely twisted, but the adjective cannot be applied to the strand as a whole. Short sections of yarn exhibit angles of twist approximating the vertical; other portions of the same yarn have angles characterizing medium- or hard-twisted, even super-twisted yarns. After a certain number of turns the twists do not "travel" along the strand, they tend to bunch together (Pl. XIV, *f*). Many of the Mochica yarns seen in Plate XV, *b* are so tightly spun as to show angle lines nearly horizontal. One specimen contains an element with five turns per eighth-inch in some sections; another has seven per eighth-inch; one of the yarns in the assortment has ten turns per eighth-inch. Super twisting produces a strong weaving yarn. When tension is put on a warp which has been spun to the crepe stage, the reserve length in the form of kinks makes for elasticity and insures against sudden breaking.

All the Mochica single-ply yarns are crepe-

Viking Fund Publications in Anthropology, No. 4, p. 57, Footnote 33, 1944.

[8] Lila M. O'Neale, "Textile Periods in Ancient Peru: II. Paracas Caverns and the Grand Necropolis," *University of California Publications in American Archaeology and Ethnology*, Vol. 21, pp. 143–202, Table 1, Berkeley, 1942.

spun, but the two-ply yarns vary in degree of twist from medium-hard to crepe. Most of the single-ply yarns are well spun; in a few instances the adjectives "irregular" and "uneven" apply. Contrasts in spinning are exemplified by specimens in which a fine, single-ply crepe warp is crossed by coarse, irregularly-spun weft elements, and by a specimen in which the usual combination of crepe-spun warps and hard-to-crepe spun wefts is reversed.

In most instances it is possible to determine the direction of the yarn twist, but wherever the exposed part of the yarn is worn away, as in Plate XIV, *e*, there is at best uncertainty. Yarns spun with the spiral directed upward to the left, result in the so-called S-twist, named from the slanting line of the letter's stem. Single-ply yarns of this type are six times as numerous as those spun with the spiral to the right, resulting in the Z-twist. In three specimens the two yarns occur together. A two-breadth specimen has single-ply S-twist warps and wefts in one breadth, S-twist warps and Z-twist wefts in the other. When hard-spun or crepe yarns of opposite twists cross in weaving, they tend to spring away from each other thus producing an irregular surface texture. Many modern crepe and pebble-face materials owe their effectiveness to this combination.

It is extremely improbable that a consideration of the effect of twist upon the appearance of cloths entered into the spinner's and weaver's calculations. The direction of the movement imparted to the spindle was much more likely to have been the result of motor habits. But it does happen that twist direction makes a perceptible difference in the surface texture of plain weaves.

The single-ply is the basic Mochica yarn. It is most often used for weaving elements, and it is combined to form two-ply and multiple-ply yarns and cords. These are usually of cotton.

The majority of two-ply cotton weaving yarns are Z-twist as a result of doubling or bringing together S-twisted singles or of giving the combination a final counterclockwise twisting. Two occurrences of two-ply yarns are found in the group of plain-weave cloths. Other short lengths of two-ply cotton yarns were salvaged from among fragments of copper tubing and plates. Specimen 4-3088a consists of a quantity of loose beads. Through five of them runs a two-ply S-twist cord formed of Z-twist singles. The cord is folded twice to make four strands and the two loops at the end of the second fold are tied in a finger knot. The two bits of cloth composing one fragment are joined with two-ply Z-twist sewing yarn, a combination of S-twist singles.

Multiple-ply cotton yarns, in this paper called cords, are less frequently encountered. Yarns salvaged from two assortments of scraps included a number of fragments. In most of these the S-twisted singles were combined in a Z-twist. The following lists the construction features of various multiple-ply cords and their uses when discoverable.

THREE-PLY COTTON CORDS

Specimen 4-2889b. A small piece of copper wound smoothly with several strands. This use of cord is found or suggested by traces of yarn on other of the Mochica fragments. If the yarns were originally colored, they may have been so arranged for their decorative effect.

Specimen 4-3097a. Fragments of three-ply cord formed of S-twist singles combined by twisting to form a Z-twist.

Specimen 4-3097d. The two breadths of the fabric are joined with three-ply cord. Seaming stitches on cloths in the Mochica group are purely functional. This specimen and one mentioned above, both from the same grave, are fragments of seamed rectangles formed by joining together narrower breadths. The stitch used is the universally known whipping or overcasting stitch.

FOUR-PLY COTTON CORDS

Specimen 16-790. A heavy four-ply cord is still in position through the perforations of a pendant. The cord is a combination of Z-twist singles united in a final twisting to form an S-twist. This cord may be a clue to the use of other fairly large multiple-ply cords in the group of salvaged fragments. Kroeber describes and illustrates[9] a variety of beads and pendants. The one, two, or four perforations made for stringing them are so planned as to keep the cord at the back of the individual pieces. Specimen 16-790 is from the same site.

Specimen 4-2889b. A small piece of copper wound with several strands of cord.

Specimen 4-3337a. The end selvage has in position a fragment of loom string between two and three inches long. It consists of four hard-spun S-twist singles carried as one twice across the web (Pl. XV, *c*).

FIVE-PLY COTTON CORDS

Specimen 16-798. One of the three cords through a perforated bead about one-fourth inch long and one-eighth inch in diameter is a five-ply S-twisted cord. Each component single is Z-twist. The other two cords are a two-ply, Z-twist and a strand too badly disintegrated for analysis.

Specimen 4-3337e. Two five-ply cords are knotted together. Both are composed of S-twist singles, but one has the final twisting clockwise, the other counterclockwise. The latter results in a softer cord.

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[9] *Ibid.*, Pls. 44, *i*, *j*; 45, *a–o*; 46, *a–v*.

Specimen 4-3337d. Heavy five-ply cord is used to sew the folds of a cloth which may have been a binding strip (Pl. XV, *d*). The singles are S-twist, the combination Z-twist.

Specimen 4-3460a. Beads are strung on a five-ply cord made by combining S-twist singles.

SIX-PLY COTTON CORD

Specimen 4-3337a. The assortment contains hard-spun, S-twist singles loosely combined by counterclockwise spinning.

EIGHT-PLY COTTON CORD

Specimen 4-3337a. Four S-twist singles were doubled at the center to make an eight-ply Z-twist.

FOURTEEN-PLY COTTON CORD

Specimen 4-3097a. A group of fourteen S-twist singles were combined by counterclockwise spinning to form a heavy cord almost an eighth-inch in diameter.

WOOL YARNS

The fragments of Mochica wool yarns retaining an approximation to their original condition are two-ply, spun soft to medium-hard. This is the expectable range of twisting given to brocading yarns since their only function is to float smoothly over the basic weave in order to develop the pattern motives and give color. Mere traces of wool in the form of mineralized knobs which spray out in small particles when pierced by a needle are red-purple and show on three copper specimens, two of them from grave 17. Brocaded motives in red and natural (?) brown wools are shown in Plate XV, *a*, *c*. Scraps of two-ply wools were found among the assortment comprising specimen 4-3337e. Both S-twists and Z-twists occur.

YARN-WOUND OBJECTS

Two groups of copper objects have cotton yarns wrapped smoothly around them or over their edges. One blunt-cornered object is of unknown use; one fragment is from a piece of metal veneer covering a wooden staff. Around it are five distinct strands of yarn, the whole band less than one-fourth inch wide. A small bit of silver plate less than a half-inch long is also wound smoothly with several strands of cotton yarn. Near the edge are four-ply yarns; the inner yarns are three-ply. The initial spinning of singles for both was S-twist; the final spinning, Z-twist.

The second group of objects showing flatly laid strands of yarn over their edges differs from the first. There are no identifiable fringes on any of the fabrics from Site F, but some of the metal fragments give the appearance of having come in contact with yarns arranged for fringe. One of a group of thirty-four hammered copper faces[10] possibly forming parts of a very large necklace, is crossed by a series of parallel yarns. A specimen in this group has a similar series of long yarns crossing the surface, their lengths unbroken by any interlacing elements. Several specimens are irregularly shaped pieces of sheet copper showing single-ply strands of cotton yarn folded over their edges or perhaps fringe yarns. Now they are held securely in the patination. All of the pieces are small, and in most instances the strands are short, but their presence is indubitable. One copper fragment has near its edge only two strands about a fourth-inch long; yarns on another fragment are equally short, but there are some twenty of them; a third fragment has over fifty lengths adhering to its broken edge as if it had been pushed up against a section of fringe.

WARP-WEFT TECHNIQUES

Nothing about the Mochica cloths leads one to interpret them as the work of inexperienced weavers. Every indication points to a firmly established textile art at Moche with beginnings beyond the earliest discovered material and with surprising lines of development.

The unusually small number of warp-weft techniques occurring among the cloths cannot be cited as proof of a limited local repertory. If, with more evidence, it is ultimately regarded as limited, it may deserve that term because certain conventions were in force or because there was partiality for certain styles of fabrics. We have the perfect exemplification for the latter in whatever it was that prompted the embroiderers of the motives on Paracas Necropolis garments endlessly to repeat the same elemental stitches.

Approximately two-thirds of the Mochica fragments are woven cloths, but about a fifth of the patches found adhering to the metals are too badly corroded to permit accurate identification of the interlacing method.

PLAIN WEAVES

In my studies of Peruvian textiles four variations of the basic cloth weave are recognized. The distinguishing feature of each lies in the number of warp or weft elements constituting

[10] *Ibid.*, Pl. 47, *a–c*.

the unit.[11] As is to be expected, the simplest over-one-under-one interlacing form occurs the greatest number of times—in almost half of the Mochica fabrics that could be analyzed. But with this proportion the similarity to cloths from the other Early sites, Supe excepted, ends. Unlike collections from other sites, the Mochica group has an unusual number of two-and-two basket weaves, that is, paired wefts interlacing with paired warps (Pl. XV, *b*). The basket modification of the plain weave is not strongly represented in cloths from Middle-period graves nor in cloths from Late sites.[12]

The plain-weave fragments from Site F, although varying considerably in texture, are so small that any interpretation of their original uses would be speculative. A dozen of the pieces like those shown in the plates are of the quality found at other coastal sites in mantles and scarves, and similar in appearance to Early Nazca textiles described as "filmy."[13] They, too, were woven of single-ply cotton yarns, the warp counts per inch ranging from 28 through 34, the weft counts per inch from 22 through 28. For most specimens, because side and end selvages are lacking, it has been necessary to proceed on the assumption that the more closely-set yarns are the warps. To this generalization there are undoubtedly exceptions, but my tabulations of hundreds of thread counts proves that the exceptions are a conspicuous minority.

The Mochica "veilings" have the following thread counts per inch: a warp range of from 28 through 48, a weft range of from 24 through 42. In order from lowest to highest warp count the series is as follows: 28 by 28, 32 by 24 (Pl. XIV, *a*) 32 by 32, 36 by 20 (Pl. XIV, *c*), 40 by 32, 40 by 40 (Pl. XIV, *d*), 48 by 42.

Several plain-weave fragments are loosely woven with coarse irregularly-spun yarns. Material of this type may have been made for wrappings, a use suggested by the specimens in Plate XV, *c*, *d*, the last a full-width specimen which shows deep creases worn through in spots as if it had been folded for a binding strip. The coarseness of these fragments is indicated by their thread counts, which follow: 13 by 13, 18 by 10, 22 by 12, 32 by 24, 40 by 30.

One fragment stands apart from the other plain weaves both in general appearance and texture owing to the fact that the warps far outnumber the wefts: Specimen 4-3097j has 72 warps by 28 wefts per inch. A second unusual feature is the combination of Z-twist and S-twist weaving yarns.

In summary, these simplest plain weaves from Site F are of white cotton, with the exception of the specimen in Plate XV, *d*, which is brown; their yarns are all single-ply, S-twist, with the exceptions noted; the spinning is for the most part fairly uniform crepe twist although some pieces show long sections of slack-twist followed by sections of extremely hard twist. There are occasional bits of side selvage but no loom-string ends on any of the fragments.

Nine of the plain-weave cloths are two-by-two basket weaves. The textural differences are pronounced, but this feature is less clearly indicated by a list of thread counts, which disregard the size of the interlacing elements, than by photography. The cloth shown in Plate XIV, *f*, woven loosely, almost like mesh, of spaced warp and weft element pairs, represents a distinct type; I do not recall having seen other Peruvian fabrics like it. The closely-woven cloths in Plate XV, *a*, *b* are the ordinary basket weaves. Some of these are in layers too thoroughly compressed to be separated without destroying the fabric.

Counts could be made on seven of the nine basket-weave fragments. Listed in order from low to high count per inch, these give us a range of from 14 to 32 pairs per inch for each set of elements: 14 (× 2) by 14 (× 2); 18 (× 2) by 18 (× 2); 23 (× 2) by 17 (× 2), Plate XV, *a*; 24 (× 2) by 24 (× 2); 26 (× 2) by 19 (× 2), Plate XV, *b*; 28 (× 2) by 23 (× 2); 32 (× 2) by 32 (× 2), Plate XIV, *f*.

BROCADED CLOTHS

Two of the basket-weave materials are brocaded. The technique is recognized by weavers as one of the simplest yet effective methods of introducing color and pattern into foundation fabric during the actual weaving. Under ordinary circumstances, the amount of

[11] Lila M. O'Neale and A. L. Kroeber, "Textile Periods in Ancient Peru," *University of California Publications in American Archaeology and Ethnology*, Vol. 28, pp. 23–56, 1930, Basic Table at end.

[12] *Ibid.*, Basic Table at end.

[13] Lila M. O'Neale, "Textiles of the Early Nazca Period," *Anthropological Memoirs, Field Museum of Natural History*, Vol. 2, p. 159, 1937.

planning and preparation is very much less than that required for design units of the damask variety. The weaver proceeds to a point where he decides to vary the appearance of his fabric and thereupon supplements the basic weft elements with yarns contrasting in color, size, or texture purely for their decorative effect. The structure of the fabric remains virtually unchanged and continues to grow independently of the pattern.

Two brocades (Pl. XV, *a*, *c*) look alike, but it it doubtful if they are parts of the same place. For one thing, the thread counts differ: 26 pairs by 19 pairs in one, 23 pairs by 17 pairs in the other. That much variation within a single well-woven specimen is improbable. The brocading yarns are two-ply natural browns and orange-red wools, coarse and loosely spun. The brown yarns in the smaller piece are medium and dark in value, some of them monochrome, others either deliberately or accidentally two-tone through the combination of single plies of the two browns.

The larger of the two pieces, 36 inches incomplete length, is divided into the following color zones: brown, 1.5 inches in depth; red, 5.0 inches; brown, 6.0 inches; red, 7.5 inches; brown, 7.0 inches; red, 5.0 inches; brown, 3.5 inches; natural white foundation weave to the loomstring end, 0.5 inch. Much of the wool has disintegrated and dropped out of the cloth, leaving holes outlining the motive shapes. In contrast to this condition, certain bits of the brocading are almost intact.

The simple brocaded designs are woven double-face; that is, they are reversible. Both cloths are alike in showing an alternation of the same motives. Each crosswise band consists of rows of concentric lozenge shapes, the long axis warp wise, alternating with rows of lozenges elaborated with small triangles at the outer edges. What is chiefly interesting about the Mochica brocades is their close similarity to cloths of the same type made by present-day weavers on backstrap looms and looms of the European treadle type. The particular combination of floats of brocading yarns over from two to six warps to form the design motives is without distinguishing detail by which to identify it as the work of an ancient people. In these particular pieces the closeness of the basic weave precludes the frequently recurring question as to whether the technique might not be embroidery. If the heavy decorative yarns had been forced through the cloth with a needle, the foundation material would exhibit skewed weaving elements.

CONCLUSIONS

The plain-weave textiles from Uhle's Site F are neither plentiful nor are they conspicuous achievements by comparison with those from Early-period sites on the southern coast, but they do establish the Mochica weavers as better than competent. Recovered shreds of cloth leave no doubt that the quality of workmanship can be evaluated in terms of recognized standards held for other ancient Peruvians; there is no trace of ineptness.

Specifically, the Mochica successfully managed single-ply cotton yarns spun so tightly that they creped upon release from tension. The Mochica also brocaded fabrics, although the few cloths patterned in this technique are of a type which recurs many times in ancient textiles and is commonplace in today's products from primitive looms.

What impresses me as noteworthy in these plain weaves is the quality of the veilings. It requires some little skill to create textures of this character because both warps and wefts must be spaced.

The Site F textiles retain almost no feature to indicate local predilections for decoration or for the methods by which they might have been developed. The one cloth (4-3298c) which shows traces of color in the form of dye raises doubts; there are no real evidences of fringes or other finishes although strands apparently extending over the edges of various metal fragments suggest such techniques. For all these familiar Peruvian components there must be substituted the unmistakable indications of Mochica awareness of textures. This statement is especially true when we take into account the twill-woven cloths which merit treatment in a separate study.[14]

University of California
Berkeley, California
September, 1946

[14] Lila M. O'Neale, "Mochica (Early Chimu) and Other Peruvian Twills," *Southwestern Journal of Anthropology*, vol. 2, pp. 269–94, Albuquerque, 1946.

TWO LENAPE ROCK SHELTERS NEAR PHILADELPHIA

MARY BUTLER

IN 1941–42 J. Frank Sterling, Paul Delgrego, and W. W. Yenney, amateurs who had become interested in collecting local Indian artifacts, excavated a rock shelter on a stream flowing into Langford Run, near the town of Broomall in Delaware County, Pennsylvania. Langford Run is a tributary of Darby Creek, which in turn flows into the Delaware River from the west at Eddystone, about ten miles southwest of Philadelphia. Further excavation, in a second shelter about 100 yards away from the first, on Langford Run proper, soon uncovered a burial, and contact was established with the University Museum in the fall of 1943 through the good offices of Dr. and Mrs. H. O. Albrecht, members of the Society for American Archaeology. Dr. J. Alden Mason, Curator of the American Section of the Museum, removed the skeleton and asked the writer to supervise further work at the site, which was carried on sporadically for another year. The two shelters were called D1 and D2, D2 being that which was dug under the auspices of the Museum.

SITE D2

The D2 shelter faces southwest, looking across the narrow valley of Langford Run toward a modern rock quarry. The shelter before excavation was a ledge about 5.5 meters wide by 9 meters long, bounded on the west by a sharp upward slope of rocky hillside, on the east by a forward jut of rock wall, and in front by an abrupt downward slope. The cliff forming its back has a slight but perceptible overhang protecting an area approximately 9 m. long and curving back from a width of 2.5 m. in the central section to a half meter at the ends. A road runs at present about 0.5 m. below and 2 m. in front of the ledge, on fill dumped within the memory of man. According to a local informant, the original swamp floor of the valley lay about 1.5 m. below the level of the present roadbed.

The shelter was excavated so far as possible in 1.5 m. squares, laid out from a base line running 58° east of magnetic north and at right angles to the rock wall. Depths were taken from a datum plane run through a nail driven into the base of a tree growing against the rock face, and this bench mark was subsequently tied in to one at a bridge about 100 m. away.

Cross sections of soil stratification show the significant feature to be a dark brown occupational layer consistently about 30 cm. deep, the top of which ran almost level throughout the main part of the shelter and implied a floor established by the Indian inhabitants. This dark layer lies on sandy yellow soil above bedrock, and is overlain along the outer two-thirds of its length by a similar yellow deposit, 40 cm. deep, washed down the western slope from the woods above. The thin layer of topsoil above this slopes down to rest directly on the dark brown soil in the 1.5 m. strip, along the rock face, which was presumably sheltered from yellow wash. An area approximately 6 m. wide by 15 m. long was excavated and recorded by varying groups of people as opportunity afforded, and the earth thrown out from the first digging was screened for further specimens. Artifacts, chips, and animal bone were lacking in the upper yellow wash, prevalent in the dark layer, especially toward the bottom, and continued into the yellow beneath. Mussel shell, broken and whole, occurred sporadically throughout the dark layer.

No evidence of significant artifact stratification was shown by what records could be kept, and decorated potsherds and triangular points were found at all depths. The shelter has a deep occupational deposit and large quantity of artifacts and refuse for a place that was used by transient rather than permanent residents. These could, however, have resulted from intensive use of a camp site by family hunting parties over a relatively short length of time rather than from sporadic use over many centuries. The site is therefore considered to fall within the late Woodland period.

Burial

The outstanding feature of the shelter was the burial of a woman about thirty-seven years old, lying flexed on her right side, facing the rock wall, and therefore with her head roughly to the southeast. Her body was discovered about 10 cm. below the surface and rested on bedrock, which sloped in such a way that her feet were 15 cm. lower than her head. There

were no grave goods, but the body had been covered with a thin layer of white clay, presumably taken from the nearby stream bed. The soil above this was sterile, but a post hole about 30 cm. in diameter was found about 50 cm. beyond the head of the skeleton.

The bones were studied by Dr. J. Lawrence Angel of the Baugh Institute of Anatomy of Jefferson Medical College in Philadelphia. They show a person about 160.2 cm. (5′3″) tall, who had lost twenty-five teeth before death, and suffered from arthritis of the cervical and lumbar vertebrae, a disease quite common among heavy workers of her age.

Dr. Angel has concluded that "the rather badly damaged Broomall cranium (Pl. XVII, *f*) is larger than the average Lenape, with broad head conforming to the Pennsylvania rather than the upstate New Jersey ('Munsee') group, probably a narrower nose than typical Lenape, and possibly a lower face (hard to determine because of loss of twenty-five teeth in life and six after death). The following characteristics are typically Lenape: low and definitely constricted forehead on a large brain case (according to Indian standards) of ovoid form; definite depression above root of nose but still showing American Indian vertical extension of this area; sharp nasal sills; broad face with cheekbones 'moderate' by American Indian standards and less jutting than Plains Indians; some flattening of fossa below cheekbones and orbits; moderate strength of jaw and mouth region with minimal tendency toward prognathism and with a strong chin; poor dentition by Indian standards.

"Except for the forward placing of the cheekbones and details of forehead region above nose root and simplicity of sutures the Broomall skull as well as many individual eastern United States Indian skulls could be easily taken for a white skull; the definitely mongoloid traits are weakly developed."

The writer, while directing the Hudson Valley Archaeological Survey in 1939, excavated a rock shelter on Goat Island, close to the east bank of the Hudson near Tivoli in Dutchess County, New York. A badly disturbed burial found there had also lain parallel to the rock wall of the shelter, and had a post hole of the same dimensions at its feet.

According to Loskiel's description of Delaware Indian burial customs in the 18th century, "At the head of the corpse, which always lies toward the east, a tall post is erected, pointing out who is buried there. If the deceased was the Chief of a tribe or nation, this post is only neatly carved, but not painted. But if he were a captain, it is painted red and his head and glorious deeds are portrayed upon it. This also is done in honor of a great warrior, his warlike deeds being exhibited in red colors. The burial-post of a physician is hung with small tortoise-shells or a calabash, which he used in his practice."[1] Heckwelder is even more to the point in describing the burial in 1762 of "a woman of highest rank and respectability, the wife of the valiant Delaware chief *Shingask*." He says that after the interment, "a painted post, on which were drawn various figures, emblematic of the deceased's situation in life and of her having been the wife of a valiant warrior, was brought by two men and delivered to a third, a man of note, who placed it in such a manner that it rested on the coffin at the head of the grave, and took great care that a certain part of the drawings should be exposed to the east, or rising of the sun; then while he held the post erect and properly situated, some women filled up the grave with hoes, and having placed dry leaves and pieces of bark over it, so that none of the fresh ground was visible, they retired, and some men, with timbers fitted before hand for the purpose, enclosed the grave about breast-high, so as to secure it from the approach of the wild beasts."[2]

There seems then every reason to think that the Broomall burial is that of an important woman, possibly a chieftain's wife, who had done plenty of hard work during her lifetime but was laid away in the style befitting her rank. The sterile soil above the skeleton points to the shelter having been abandoned after the burial took place. The question arises as to why a satisfactory, long-used camp site would have been sacrificed for a grave that could presumably have been dug anywhere in the surrounding woods. One can think of various reasons: If the burial took place in winter, the ground outside the shelter would have been frozen hard while that inside would have been warmed and diggable. Also the situation chosen could have been protected from possible wild beasts far more easily than an open one. Whatever the reason, such a use of the shelter might be considered additional evidence of the importance in life of the deceased.

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[1] Loskiel, 1794, Pt. 1, pp. 119–21.

[2] Heckewelder, 1819, pp. 264–70.

Artifacts: Stone

The stone artifacts from both shelters were identified petrologically by Dr. A. Williams Postel of the Geology Department of the University of Pennsylvania and Dr. E. H. Watson of the Geology Department of Bryn Mawr College. The material used for mortars, hammerstones, and one pestle was local, either the Wissahickon schist native to the site or pebbles presumably from the creek. The other artifacts were made of quartz, quartzite, slate, shale, siltstone, soapstone, sandstone, chert, and lava. Of these only the vein quartz and soapstone could unquestionably have been local. Occasional quartzite and rarer sandstone and stiltstone boulders occur among the gravels capping the hills around Broomall. The nearest occurrence of quartzite, however, would, according to Dr. Watson, be at Valley Forge, 10 miles northwest, or Avondale, 25 miles southwest. The nearest outcroppings of sandstone would, like the shales and slates, be found in the so-called Appalachian folded belt of mountains, 30 to 50 miles wide, running northeast-southwest across Pennsylvania. This comes closest to Broomall at the southern edge of the Lehigh Water Gap, 56 miles to the northwest. Cherts come from pits in Bucks, Berks, and Lehigh Counties, the light brown jasper frequent at Broomall probably coming from Vera Cruz near Allentown. While some of this material could have washed south along river beds, the shales and slates could not have done so without disintegrating. The nearest source for lava and the only one east of the Rockies, aside from an older type in New England, is South Mountain below Chambersburg, 120 miles to the west.

Quality of workmanship varies, to a large extent according to material. Flinty materials tend to the well made, shales badly made; quartzes and quartzites show the greatest variation. The quantity of chips in the soil as well as the probable rejects and incompleted points found throughout the shelters show that a good deal of whittling went on there.

Technological and functional categories coincide, since with a few exceptions, tools and weapons were chipped and ornaments were ground. Categories dividing presumable arrow points from knives and blades have been established arbitrarily on the basis of size. Stemmed specimens up to 8 cm. in length and triangles up to 4 cm. are classed as points. Points are called triangles or stemmed. The triangles may be equilateral or isosceles, some with convex sides (Pl. XVI, A, *a–c*), some with concave bases; the stemmed points may be square-tanged (Pl. XVI, A, *q*, *r*), pointed-tanged (Pl. XVI, A, *n*, *o*), side-notched (Pl. XVI, A, *g–k*), or lozenge-shaped (Pl. XVI, A, *p*). The tanged points vary only in size, but the side-notched ones vary in shape as shown. The only shape that knives and blades share with points is the concave-based triangle (Pl. XVI, A, *u*). The other knife and blade types are triangular (Pl. XVI, A, *t*), square-based (Pl. XVI, A, *x*), round-based (Pl. XVI, A, *y*), corner-notched (Pl. XVI, A, *v*), and semilunoid (Pl. XVI, A, *w*).

Hunting. The interesting feature of the sixty-six points from site D2 was the proportionately large number of triangles, most of them well made. Side-notched points were next in frequency and, like other stemmed points from this site, were on the whole poorly made. More than half of the twenty-three knives and blades from site D2 were square-based; the rest were triangular and round-based. Relative frequency of point shapes and materials is shown is Tables 3 and 4; that of knives and blades, in Tables 5 and 6.

Handicraft. Site D2 produced ten drills or gravers, four of them T-shaped, three straight (Pl. XVI, A, *e*), two roughly triangular (Pl. XVI, A, *d*), and one reworked equilateral triangle. Seventy per cent were of flinty materials, thirty per cent of shales and sandstone. The five scrapers were all end-scrapers, one keeled (Pl. XVI, A, *l*), and four flat retouched flakes (Pl. XVI, A, *m*).

Housework. No large anvil has come from this site, but a sandstone pestle found here, 25.5 cm. long and 6 cm. in diameter, may have

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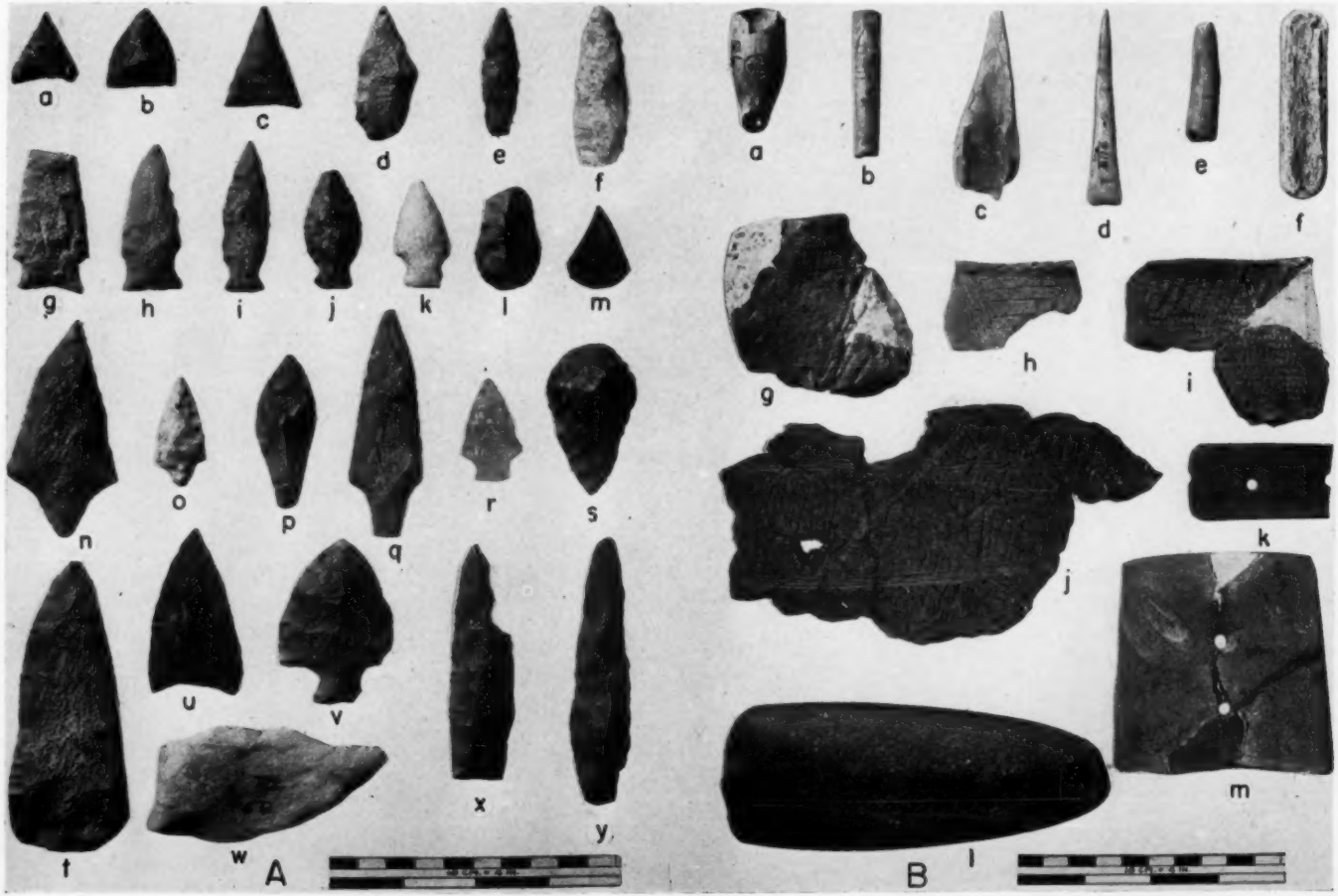
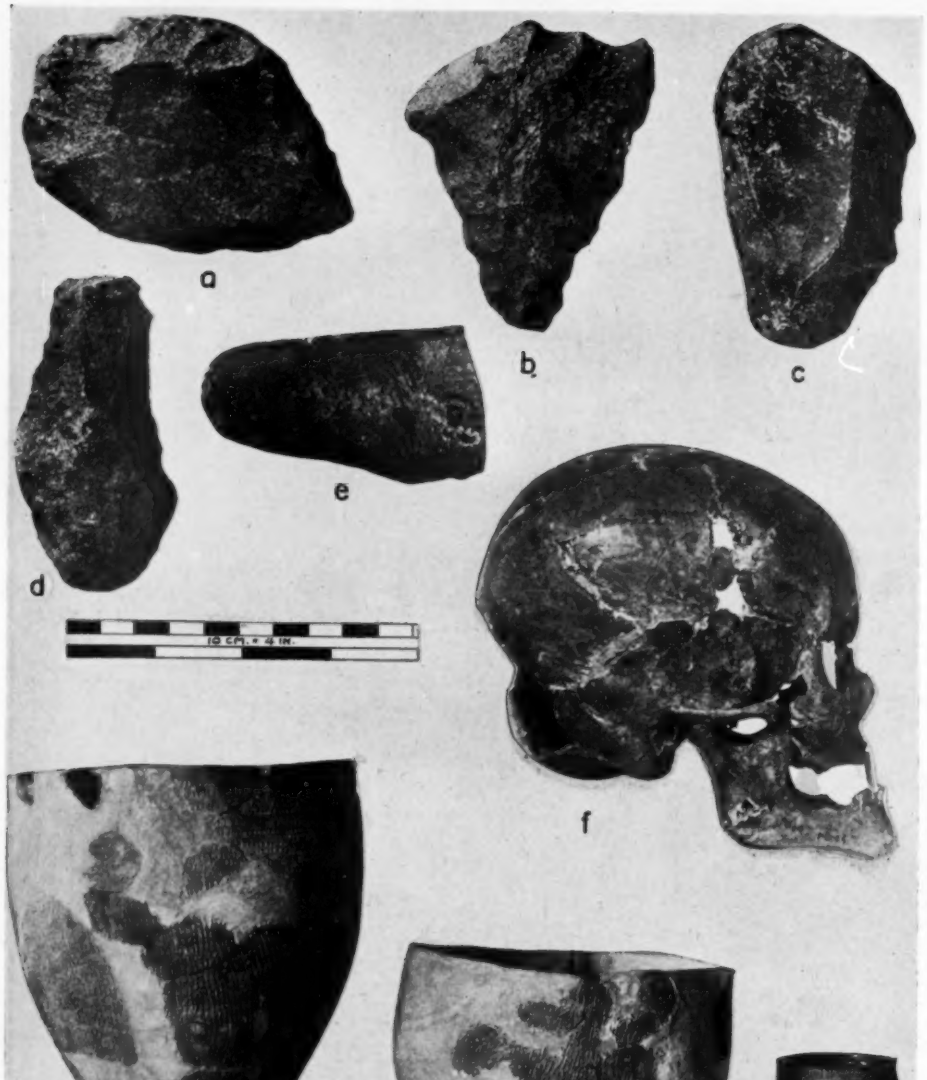
PLATE XVI

A, work in chipped stone: *a–c*, triangular points; *d*, *e*, gravers; *f*, graver blank; *g–k*, side-notched points; *l*, *m*, thumb scrapers; *n–o*, pointed-tang points; *p*, lozenge-shaped point; *q*, *r*, square-tang points; *s*, pick; *t*, *u*, triangular knives; *v*, corner-notched knife; *w*, semilunoid knife; *x*, square-based blade; *y*, round-based blade. B, trade pipes, bone, pottery, ground stone: *a*, *b*, trade pipes; *c*, *d*, bone awls; *e*, *f*, bone flakers; *g–j*, decorated sherds; *k*, gorget; *l*, celt; *m*, gorget. *c*, *e*, *f*, *l*, *m*, of B are from Site D1; the rest of B, from Site D2.



Material from rock shelters near Broomall, Pennsylvania. (See facing page for identifications.)



Material from rock shelters near Broomall, Pennsylvania. *a*, *b*, knives; *c*, *d*, flake scrapers; *e*, grooved bannerstone fragment; *f*, female skull; *g*, pottery vessel with open mouth, conoidal base; *h*, pottery vessel with open mouth, flattened base; *i*, pottery vessel with constricted neck, conoidal base. *a–d*, *g*, *h* are from site D1; *e*, *f*, *i*, from site D2. *f* from a photograph by J. Lawrence Angell.

been used in a tree-trunk mortar. Seven out of eight pitted stones, ranging in size from 8×8 to 12×12 cm., with from one to four conical holes on each side, were found in two piles 3 m.

Fragments of only four vessels show any decoration beyond the cord-wrapped stick (Pl. XVII, *i*) and cord-paddled (Pl. XVII, *g*, *h*) surface finish found on most of the sherds.

TABLE 3. SHAPES OF POINTS

	Triangular (*Pl. XVI*, A, *a–c*)	*Square-tanged* (*Pl. XVI*, A, *q*, *r*)	*Pointed-tanged* (*Pl. XVI*, A, *n*, *o*)	*Side-notched* (*Pl. XVI*, A, *g–k*)	*Lozenge-shaped* (*Pl. XVI*, A, *p*)
Site D1 (106)	7%	31%	38%	23%	1%
Site D2 (66)	40%	3%	13%	38%	6%

TABLE 4. MATERIALS OF POINTS

	Cherts	*Quartzes*	*Shales and Sandstone*	*Lava*
Site D1	16%	33%	45%	6%
Site D2	40%	30%	23%	6%

apart. Mr. Yenney has suggested that the Indians kept them together ready for use, possibly in starting fires. River pebbles provided the material for an anvil about 8 cm. in diameter, pecked on both sides; nine hammerstones, one of them pitted; two mullers; and a stone ball.

Ornaments. One oblong siltstone gorget fragment (Pl. XVI, B, *k*), is part of a reworked specimen having at least three holes. The reworked end, decorated by nicks, is gray in color, the other reddish. A gray siltstone fragment gives every indication of having been an unfinished grooved bannerstone (Pl. XVII, *e*), used as a hammerstone after having been broken.

Bone

Three splinter awls were the only pieces of worked bone found at site D2. Only one (Pl. XVI, B, *d*) had been finished below the point.

Pottery

Vessels. About one thousand potsherds yielded one reconstructible vessel (Pl. XVII, *i*), segments of six more, and rim sherds from eighteen others. The range of shapes is shown by Plate XVII, *g–i*, the open-mouthed variety of *g* and *h* predominating since only one vessel, two segments, and two rimsherds had constricted necks. Evidence as to base form is very slight since only two base sherds were found, one conoidal and one flattened.

One open-mouthed vessel had on it a triple-line inverted triangle design deeply impressed by a cord-wrapped stick over a lighter cord-wrapped stick surface finish. Another had a linear design apparently made by dragging a dull-toothed tool or twig across a wet cord-paddled surface (Pl. XVI, B, *j*). Another rim-sherd had an incised triangular design (Pl. XVI, B, *h*) and two body sherds showed short incised slashes slanting one from left to right, the other from right to left.

Tempering material, as seen with the naked eye, was predominantly gravel, but included sand, mica, and occasional shell. Dr. Postel has suggested that all but the shell-tempered sherds were self-tempered. The rock formation of the general Philadelphia area is Wissahickon complex, a mica schist or gneiss with quartzites and pegmatites. As this weathers, the feldspars it contains turn to clay, hence the banks or bed of any local steam hold all the constituents of the average pottery vessel. A potter could take her clay from a coarsely mixed pocket and have a gravel-tempered pot, while that from a finer pocket would make a sand-tempered one.

Pipes. Five pipe fragments were found, two being thin undecorated bowl pieces, two stem pieces, the more complete one about 6 cm. long from bit to bowl, and one piece showing a 150° joint between stem and bowl base, also undecorated.

Trade Material

Of two long, slender, unspurred bowls and eight stem fragments, three of them burnt, from English white clay pipes, one bowl and one stem bear maker's marks. The bowl has the initials W E incised on the side that faced the smoker, in block letters, surmounted and underlined by a row of three dots, the whole surrounded by a dotted circle (Pl. XVI, B, *a*). The stem has a band around it 1.5 cm. below the bit containing the letters L E preceded and followed by incised vertically-set lozenges, with a double dotted line above and below (Pl. XVI, B, *b*). An identical stem from Salisbury, New Jersey,[3] is tentatively identified by Dr. Cross as having been made by Legg of Broseley. Mr. H. Geiger Omwake of the Archaeological Society of Delaware feels however that both W E and L E specimens from Broomall were very probably the handiwork of members of the Evans pipe-making family of Bristol during the reign of William III (1688–1702). The style of the pipes fits this period, and while Luellin Evans is first heard of in 1661 and Williams Evans in 1667, presumably both were still working after 1688.[4] The pipe fragments were found scattered throughout the site at the black dirt level of greatest incidence of artifacts, and are considered to be contemporary with it.

A tooth-marked musket-ball 0.7 cm. in diameter, a fragmentary disk identified by Dr. Albrecht as dried ultramarine blue paint, and a gilt-washed brass button complete the list of possible trade goods. The button has a champlevé Willow-plate type of design on the face and an inscription RICH TREBLE GILT surrounding the shank on the back. It has been described as a button of the Omega type by Mr. Archibald Crozier of the Archaeological Society of Delaware, and dated by him at 1800–1830.[5] Since the Indians no longer lived in the Philadelphia area by this date,[6] the button is considered intrusive to the site, along with an iron quarry wedge, a gun part, a cache of broken glass, and other objects belonging to the "Beer Bottle" or "Boy Scout" Period, found at varying depths throughout the site. Nuts found with the glass and a live toad discovered under a rock a foot below the surface point to two possible methods of intrusion.

Table 5. Shapes of Knives and Blades

	Triangular (*Pl. XVI*, A, *t*, *u*)	*Square-based* (*Pl. XV I*, A, *x*)	*Round-based* (*Pl. XVI*, A, *y*)	*Corner-notched* (*Pl. XVI*, A, *v*)	*Semi-lunoid* (*Pl. XVI*, A, *w*)
Site D1 (43)	53%	21%		14%	12%
Site D2 (23)	22%	60%	17%		

Table 6. Materials of Knives and Blades

	Cherts	*Quartzes*	*Shales and Sandstone*	*Lava*
Site D1	16%	33%	45%	6%
Site D2	13%	9%	74%	4%

Summary

The material from site D2 is homogeneous and consistently local in character. It conforms to what we know of the Coastal Woodland pattern and is dated by the trade pipes as early contact, possibly about 1700. The only Indians living according to the Woodland pattern in the Philadelphia area at that time were the Lenni Lenape or Delaware. The Susquehannock traveled through the trade with the whites but their material culture belongs to the Mississippi pattern. The D2 shelter can therefore at present be considered a type camp-site of the early historic Delaware.

[3] Cross, 1941, Pl. 25a, 5, 8; p. 61.

[4] H. Geiger Omwake, correspondence, 1945.

[5] Archibald Crozier, correspondence, 1945.

[6] "By 1742 distrust of the whites and the intrigues of land aggression had caused the removal of the Delaware Nation from the Delaware River to the Susquehanna." Speck, 1935, p. 8; see also Watson, 1856, p. 172.

SITE D1

The D1 shelter also faces southwest, about 20 m. up a sloping hillside from a small stream that flows through a narrow valley into Langford Run a short distance below site D2. The point of confluence and the two shelters form a roughly equilateral triangle about 100 m. on a side, the two streams being separated by the ridge behind site D2 which is known locally as Kemble's Rocks. The shelter itself has a pronounced, low overhang and could be classed as a small cave. However as much material came from the ground in front of the shelter as from that inside it. Shell remains were thick in the dark occupational layer. The artifacts from site D1 are undocumented, and have been studied on a purely typological basis.

Burial?

Part of the skull of a woman about thirty years of age and a dog skeleton, identified at the Philadelphia Academy of Natural Sciences, were found among the animal bones from site D1.

Artifacts: Stone

Hunting. The 106 points from the D1 shelter, almost entirely stemmed ones, were relatively well made. The most frequent type was the pointed-tanged (Pl. XVI, A, *n*, *o*), which was seldom found at site D2. Seven of the side-notched specimens had rounded instead of pointed tips, and a lozenge-shaped one had been blunted by wear and tear. Although the forty-three knives and blades were almost twice as numerous as at site D2, the round-based type (Pl. XVI, A, *y*) is missing here; and a corner-notched (Pl. XVI, A, *v*), a semilunoid (Pl. XVI, A, *w;* Pl. XVII, *a*), and an atypical triangle (Pl. XVII, *b*) make their appearance. Relative frequency of shape and material for points is shown in Tables 3 and 4; for knives and blades, in Tables 5 and 6.

Handicraft. There were twenty-four drills or gravers from site D1, one of them the base of a T-shaped drill, fifteen roughly triangular (Pl. XVI, A, *d*), two straight (Pl. XVI, A, *e*), and six blanks or unfinished specimens of straight drills (Pl. XVI, A, *f*). Forty-six per cent were of quartzes, 25 per cent of flinty materials, and 20 per cent of shales and sandstone. Two of the four scrapers were large brown jasper thumb-scrapers, the other two were large flakes (Pl. XVII, *c*, *d*), proven to be tools, although they lack retouching, by the fact that they are of quartzites and siltstone that could not have occurred naturally in the Broomall shelters. Two small brown jasper picks, one well-made (Pl. XVI, A, *s*) and one crude, belong to the group of hand tools for fine work. They most closely resemble miniature *coups-de-poing.* A plano-convex celt (Pl. XVI, B, *l*), the only ax of any kind from either shelter, was made of fine serpentine and chromite which may have come from Wood's chrome mine near Oxford, Pennsylvania.

Housework. Two large stone mortars, one with two holes on one face, the other with a pestle lying by it, and a third, small mortar were found in front of the shelter. Three mullers, one pitted hammerstone, two small stone balls, and a used pebble came from the same area.

Ornaments. Five fragmentary gorgets, two of siltstone, two of soapstone, and one of red slate; and three blanks, one of siltstone, one of soapstone, and one of fine-grained quartzose schist, came from site D1. The only complete gorget, a quadrilateral one made of siltstone, was found broken (Pl. XVI, B, *m*). The other gorgets had been elongated ovals, three showing two holes, the other three holes.

Bone

Two flakers came from site D1, one a piece of worked bone (Pl. XVI, B, *f*), the other an antler tip with a rounded end (Pl. XVI, B, *e*). A scraper and three awls were found there, one awl worked (Pl. XVI, B, *c*), the other two merely fragments of split leg bone.

Pottery

Vessels. Over one thousand sherds were recovered from site D1, including two reconstructible vessels (Pl. XVII, *g*, *h*), segments of nine others, and rim sherds from sixteen more. One of the reconstructed vessels and a sherd from another vessel had the flat base considered by Cross characteristic of southern New Jersey pottery (Pl. XVII, *h*). Otherwise the pottery was indistinguishable from that of the D2 shelter. The constricted neck shape (Pl. XVII, *i*), was represented by only one rim sherd, all the others being straight, slightly flaring, or slightly incurved.

At least two vessels were finished by a net-wrapped paddle impression and two by a cord-wrapped stick; one bears indistinct marks of what may have been a plain-cloth fabric; and the remaining identifiable sherds seem to have

been cord-wrapped paddle impressed. Only seven fragmentary sherds bear any further decoration. Three show deep cord-wrapped stick impressions, two in a rough chevron pattern; one had the linear design scratched across a cord-paddled surface that was found in site D2 (Pl. XVI, B, *j*); and three had linear incised designs over cord-paddling, two deeply cut, one thinly cut, apparently parts of the kind of design shown in Plate XVI, B, *h*.

Tempering material had the same range and frequency as that of pottery from site D2.

Pipes. One piece of pottery pipe stem, 3 cm. long and 1.0 to 1.2 cm. wide, was found in site D1. A piece of shapeless baked clay suggests that the pottery may have been made at the site.

SUMMARY AND CONCLUSIONS

There is enough difference between the material from sites D1 and D2 to warrant considering the first protohistoric and the second early contact. The absence of trade goods and the scarcity of triangular points in the D1 shelter are the basis for this dating. It can, however, be only tentative in view of the homogeneity of the rest of the material from the two shelters. The importance of the shelters lies in the fact that they provide a collection of artifacts tied in archaeologically to the Red Valley focus of the Coastal aspect of the Northeastern phase of the Woodland pattern and historically to the Lenni Lenape or Delaware Indians.

The material from Broomall is almost identical with that from southern New Jersey sites such as Salisbury, and bears out Cross' modifications of Ritchie's definition of Coastal Algonkin.[7] Broomall has the flexed burial, celt, grooved bannerstone, gorget, shallow mortar, cylindrical pestle, oval end-scraper, obtuse-angle pottery pipe, crude open-mouthed pointed-base pots, and scarcity of bone listed by Ritchie as Early Coastal traits.[8] But the Pennsylvania site, like New Jersey ones, adds to these an occasional flat base on the prevalent wide-mouthed pottery vessel; the presence of the constricted-neck jar; cord-wound stick-impressed surface finish; occasional incised, punctate, or cord-wound stick-impressed decoration; and frequency of pointed tang, side-notched, and white quartz projectile points. It lacks any trace of stone pipes.

The type and quantity of artifacts found in the Broomall rock shelters bear witness to a relatively settled life engaged in by a family group or groups rather than sporadic camping-out by hunters on the trail. Pottery shows the presence of women either to make or to carry it there, and the skeletal remains corroborate this. The many misshapen and broken stone points may be the result of children's attempts at tool-making. The animal bones, identified by Dr. Earl Poole of the Reading Public Museum and Art Gallery of Reading, Pennsylvania, include Virginia deer, rabbit, raccoon, woodchuck, and red fox, all local varieties of no great age or distinction.

When, therefore, we find contact material in one of the shelters we feel safe in assuming that the people who used it were the Delaware Indians native to the Philadelphia area at the time the whites arrived.[9] This is checked by the fact that the Delaware were the only Indians in what is now southeastern Pennsylvania whose material culture would have conformed to the Woodland pattern.

We know that in the area covered by present-day Philadelphia, protected by water on three sides, were at least seven permanent Delaware villages, presumably of the Unami tribe since their territory stretched from the Lehigh River to the Delaware state line.[10] Five were on the west bank of the Delaware River and at least two on the Schuylkill, one of which, Passajung, was the largest and most important of all, and had a chief who exercised a certain authority over all of the other chiefs. "The chiefs of the villages in the Philadelphia area, as well as those from New Jersey, claimed ownership of lands immediately south, west and north of their permanent villages" which they kept bare of villages and used as buffer hunting country, to protect themselves against raids by the Nanticoke and Eastern Shore Indians to the south, the Susquehannock to the west, and the Five Nations to the north. "Everything leads to the conclusions that the Philadelphia villages housed the largest part of the Delaware population on the western shore of the river, and that hunting parties fanned out from these villages at certain times of the year to seek fish and game in the surrounding region. These parties were away from their homes

[7] Cross, 1941, pp. 210–11.

[8] Ritchie, 1938, p. 104.

[9] Penn, 1937; Lindeström, 1925.

[10] Hodge, 1912, p. 868; see also Brinton, 1885, p. 37.

perhaps months, certainly weeks at a time, and consequently they found temporary abode in rock shelters and camp sites generally located in the vicinity of springs or running streams of water."[11] There is every reason then to feel that the Broomall rock shelters were hunting camps of Delaware Indians from one of the permanent villages in the Philadelphia triangle. They would seem to disprove a recent suggestion "that pressure exerted by the hostile Conestoga or Susquehannock, an Iroquois tribe of the Susquehanna Valley, resulted in the northward displacement of the Unami from the lower Delaware in Pennsylvania in late prehistoric times."[12]

The Broomall shelters can also at present be considered typical of the late Coastal Algonkian culture of this area. Although they lack the agricultural and fishing tools that could have been found in one of the permanent village sites long since vanished beneath the streets of Philadelphia, there is obviously little hope of finding anything more comprehensive. The mineralogical evidence raises interesting questions as to aboriginal trade. The fact that so many objects were made of imported stone does not mean that the people using them were foreigners. Even if typology did not show the artifacts to be of a local culture, the geographical range of sources would preclude their having been brought to Broomall by a single group of people. Materials from widely separated areas were worked into homogeneous groups of objects typical of the local Red Valley focus, and each kind of stone was used for a variety of shapes, facts which imply that the artifacts were made locally from material brought south in raw or semifinished state. Unfortunately chip material from the shelters was discarded so that we are unable to say whether local and foreign, or only local, stone were worked at the site. A detailed geological study of debris will be our only method of determining whether objects of foreign material were made locally or at their source.

If the inhabitants of the Broomall rock shelters came there periodically from a village in the present Philadelphia area, presumably they brought most of their artifacts with them, whether in raw or finished form. The Schuylkill and Delaware Rivers both lead into the northern area from which slates, shales, and sandstones came, and they cross the country producing quartzite and cherts. The permanent Lenape villages, lying some of the Schuylkill, some of the Delaware, would obviously lie on trade routes from which the Langford Run shelters would be isolated. We do not know whether foreign materials were fetched from their sources by the Philadelphia Lenape, whether they were traded far afield by natives of the quarry sites, or whether there was an organized trading system with itinerant retailers.

From the archaeological point of view, the differences in materials used in Broomall shelters D1 and D2 stand more chance of being significant chronologically when we know they are due not to individual choice among local materials but to a change in the economic picture. We are also forced to discard the stock explanation for using such unsatisfactory stone for chipping as shales and slates: "the best they had at hand." From the point of view of local pride, the Philadelphian can consider this evidence of the importance of his city as a center for trade even before the white man came.

The Broomall shelters give the first concrete evidence of the westward extension of the Red Valley focus into southeastern Pennsylvania. The other sites so far reported from this section of the state comprise open camp sites in Chester County[13] and along the Schuylkill,[14] and rock shelters in the Delaware Valley,[15] on the lower Susquehanna,[16] and the Schuylkill.[17] The other Pennsylvania rock shelters so far published lie in the northeastern[18] and southwestern[19] sections of the state.

The information available from these reports shows that the bulk of the stratified deposit in the Poplar Neck shelter on the Schuylkill near Reading[17] conforms to Ritchie's Early Coastal focus, and that collared, decorated rim sherds occur in the one opposite Chickies on the Susquehanna.[16] Schrabisch, who investigated countless shelters throughout eastern Pennsylvania, northern New Jersey, and southern New York, gives no details as to pottery

[11] Weslager, 1942, pp. 54–5.

[12] Ritchie, 1944, p. 14.

[13] Mason, 1941.

[14] Gilkyson, 1945; Huber, 1931.

[15] Schrabisch, 1919, p. 144; Schrabisch, 1930; Mercer, 1897.

[16] Haldemann, 1881.

[17] Poole, 1939.

[18] Clausen, 1932; Wilhelm, 1935; Schrabisch, 1926.

[19] Augustine, 1938.

and projectile-point shape and decoration, but describes a pattern for such sites that could be taken as characteristic of Coastal Algonkin shelters in general and certainly applies in particular to those at Broomall. His Indians required southern exposure and nearby water, and left behind them stone and bone artifacts that included awls, drills, scrapers, arrow points, ceremonial stones, pestles, and pitted hammerstones, but lacked axes. Chips, animal bones, and *Unio* shells were plentiful, and pottery, in some instances over one thousand sherds, was found in almost every shelter.[20] Schrabisch comments, incidentally, on increase in pottery and decrease in stone in Pennsylvania shelters as compared to those in the New York mountains, and feels that it may be due to the fact of the Delaware being fishermen and therefore needing less stone.[21]

What Pennsylvania associations we can find, then, for the Broomall material, throw no further light at present on the extent of the Red Valley focus, but the close resemblance of sites D1 and D2 artifacts to those from the Crane Hook site near Wilmington, Delaware, another hunting territory of the Philadelphia Lenni Lenape,[22] implies that north Delaware may also fall within the limits of that focus.

Going further afield we find similarity of burial custom between the Broomall D2 shelter and the one on Goat Island in the Hudson in what is marked on early maps as Wappinger territory. It is interesting to note that a list, drawn from old Pennsylvania documents, of the members of the Algonkin confederacy powerful at the time of the discovery of America gives them as "the Chiholacki or Delawares, the Wanami, the Munsi, the Mohicans and Wappingers."[23] We have resemblance in pottery types between the Broomall sherds and those identified by Rouse in southern Connecticut as Windsor, a style that may have been widely distributed through southern New England and eastern Long Island.[24] Eventually such links as these between distant but related peoples may help to fill in the incomplete groundplan for Coastal Algonkin.

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[20] Schrabisch, 1915, pp. 19–20.
[21] Schrabisch, 1930, p. 55.
[22] Swientochowski and Weslager, 1942.
[23] Brinton, 1885, p. 20, Footnote.
[24] Rouse, 1945.

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HOUSE TYPES OF THE MIDDLE FRASER RIVER

MARIAN W. SMITH[1]

TIES between northeastern Asia and northwestern America are frequently postulated but have never been satisfactorily worked out in detail. Forms of subterranean or semi-subterranean houses and of large plank buildings were known in both regions and this fact has been used to suggest northern Asiatic-American relationships.[2] It seems clear that some prehistoric ties did exist between the two regions but their exact nature remains unknown. Fuller data and more careful comparisons are needed and one segment of the American distribution is therefore given below.

Plank houses were used along the Pacific coast of North America from northern California to southern Alaska. Pit houses occurred throughout the interior Plateau area. The dividing line between the two types follows the mountains, the Cascades and the Coast Range, which serve to separate the Plateau from the southern Northwest Coast. The mountains are cut by two great rivers, the Columbia and the Fraser, and it is the purpose of this paper to examine the distribution of house types in the region of the middle Fraser.

The character of the Fraser changes radically at Yale (see Fig. 67), which marks the end of the river's canyon and its precipitate plunge to the coastal plain. At least as early as 1862 Yale was taken as the dividing line

[1] This study utilizes ethnographic notes taken in 1938 under the auspices of the Columbia University Council for Research in the Social Sciences and includes data obtained on the Columbia University Summer Field Session of 1945. Appreciation is also due to those students of the Field Session who participated in the brief archaeological work, Helen Codere, Robert N. Hill, Eleanor B. Leacock, and Estelle Sillen, and especially to Mrs. Leacock for her interest in the archaeological project.

[2] See Jochelson, 1907; Olson, 1927; Waterman, 1921; etc.

between the Coast Salish of the lower river and the Interior Salish of the Plateau.[3] The Harrison who lived below Yale and on lower Harrison Lake[4] speak a dialect intimately tied to the Coast Salish of the lower reaches of the river. The people of the Chilliwack River, a southern tributary of the Fraser entering the river just south of Harrison Lake, also speak a dialect similar to those of the Fraser villages. These people have had close contacts with the Nooksack who lived on the neighboring river of that name. The Nooksack spoke a Salish language whose affiliations have not been established, but they were within the continuous Coast Salish cultural distribution.

FIG. 67. The Middle Fraser and surrounding region.

Later anthropological literature has also used Yale to mark the dividing line between these Coast Salish of the middle Fraser and the Lower Thompson, an Interior Salish people of the upper reaches of the river. Another group of Interior Salish, the Lower Lillooet, impinge on the region from the north, their territory generally being accepted as including the headwaters of Harrison Lake. Recent studies of the Plateau use these boundaries between Interior and Coast Salish and therefore substantiate the general impression that the boundaries between the two also mark the dividing line between pit and plank house types. New data have made it advisable to reexamine this situation and it will be convenient to begin by grouping the materials for each of the four peoples: Lower Thompson, Lower Lillooet, Harrison, and Chilliwack and Nooksack.

Lower Thompson. It has long been recognized that the Lower Thompson used pit houses as their main winter dwellings. The use of Yale as the point of division between pit and plank houses is best documented by Teit: "The Indians of Yale constructed a few of these dwellings (pit houses) shortly before 1858, but ordinarily they lived in large lodges made of split planks. Only one single instance is known of a lodge of this kind being built in Spuzzum. It was constructed about forty years ago, by people related to the Coast Indians."[5] Pit houses were not constructed along the coast nor the lower reaches of the Fraser and this statement suggests that pit houses reached Yale "shortly before 1858" for the first time. The inference is that no pit houses were built below Yale in the area of the middle Fraser.

The statement also identifies the plank house with the Coast Salish and indicates that it penetrated beyond Yale only in the late historic period. On June 28, 1808, Fraser encountered plank houses, presumably for the first time, at a point either at Yale or somewhat above it: "an excellent house forty-six by thirty-two and constructed like American frame houses; the planks are three or four inches thick, each plank overlapping the adjoining one a couple of inches; the posts, which are very strong and rudely carved, receive the cross beams; the walls are eleven feet high and covered with a slanting roof. On the opposite side of the river there is a considerable village, with houses similar to the one on this side."[6] It is clear that the plank house was the main type at Yale in the first years of the nineteenth century. The most accurate phrasing seems to be to place the upper limit of the plank house area somewhere between Yale and Spuzzum. Certainly the plank house did not penetrate deeply into Lower Thompson territory.

[3] Mayne, 1862, p. 295.

[4] Use of the term Harrison for these people is not without precedent and has the advantage of lumping together those of the Coast Salish who had direct contact with the Lower Thompson and Lower Lillooet.

[5] Teit, 1900, p. 195.

[6] Fraser, 1889, p. 193. Fraser was the first European known to have been in this part of the country.

Lower Lillooet. All sources agree that the Lower Lillooet built about equal numbers of pit and plank houses. Hill-Tout places "both the long house and subterranean or winter house among the Lillooet."[7] Teit writes that "probably over half of the Lower Lillooet lived in communal houses made of logs and planks after the manner of the Coast tribes."[8] Ray confirms this, saying of the Plateau: "Another intrusive form, the plank house, is frequently used by the Lower Lillooet.[9]

No indications are given of the upper limits of plank houses in Lillooet territory. It is equally unsatisfactory to attempt to trace the lower intrusions of pit houses from Lillooet to the coast. Barnett mentions only plank houses for the Salish of the Gulf of Georgia[10] but Hill-Tout places pit houses on the upper reaches of the Squamish River: "Only the upper tribes on the Skqomic River used the subterranean house."[11] It is clear, however, that where Lower Lillooet territory impinged on that of the middle Fraser both pit and plank houses were in use.

Chilliwack and Nooksack. The Nooksack River is now a tributary of the Lummi so that its drainage is primarily westward. Earlier, however, it swung north and flowed into Sumas Lake and from there reached the Fraser not far below the Chilliwack. Sumas Lake was drained to make way for hop fields and it is difficult now to visualize the former course of the Nooksack. This former course does, however, serve to explain the close ties of the Chilliwack and Nooksack despite their differences in language, ties which were perpetuated by frequent intermarriage.

Both Chilliwack and Nooksack are ordinarily thought of as squarely within the plank house area. Yet Hill-Tout, in the only published account of the Chilliwack, adds to his mention of the plank house that the pit house "was also occasionally used by some of the Tcilqeuk."[12]

During field work in this region in 1938 both Bob Joe, a Chilliwack informant, and Jack Jimmy, one of the few remaining Nooksack, described pit houses. Their information checked in all details and may be combined here. The house had a circular pit and the roof was supported by four posts. The posts stood against the wall of the pit and the top of each was slightly below the level of the ground. The top was notched to receive a rafter the upper end of which was attached to one corner of a square hatchway. The joinings were made secure by notching and by tying the parts together with withes run through drilled holes. Supplementary "posts" were set and timbers radiated from these to rest upon the hatchway; these were tapered at the ends so they did not overlap. The final roof was pyramidal and only four or four and a half feet above ground level. The pit was from ten to twenty feet deep. The houses were sometimes as large as thirty feet in diameter and in well-made houses the wall posts (or planks?) were carefully finished to present a smooth inner surface. The four main posts were enough larger in diameter so that they protruded a foot or two beyond the others and they were carved from above the bed platform to the rafter. The rafters were also well finished and often painted. The bed platforms were four feet above the floor and were six feet wide. Partitions separated the sleeping quarters so the beds were only open at the foot. Pit houses of this construction were said to have been connected underground. They were occupied by several families but there was only one cooking fire, beneath the hatch. The ladder was a notched pole and the notches often stopped a couple feet above floor level so the unwary stranger might fall. Such an accident was thought to be a great "joke."

Woodwork apparently formed an important part of this Chilliwack and Nooksack pit house. The house seems indeed to have been in many respects a subterranean plank house. But whatever its structural associations, the ethnological record places the pit house with the plank house among the Chilliwack and Nooksack at the southern end of the drainage of the middle Fraser.

Harrison. After Fraser left Yale he traveled by canoe and, since he was going downstream, must have been making pretty good time. On July 1 he arrived "at a large village .... Their houses are built of cedar planks and in shape similar to the one already described; the whole range, which is 640 feet long by sixty broad, is under one roof; the front is eighteen feet high and the covering is slanting; all the apartments which are separated by partitions

[7] Hill-Tout, 1905, p. 133.
[8] Teit, 1906, p. 213.
[9] Ray, 1939, p. 132.
[10] Barnett, 1938, pp. 126–8.
[11] Hill-Tout, 1900, p. 485.
[12] Hill-Tout, 1902, p. 360.

are square except the chief's, which is ninety feet long. In this room, the posts or pillars are nearly three feet in diameter at the base and diminish gradually at the top. In one of these posts is an oval opening answering the purpose of a door through which one man may crawl in or out. Above, on the outside, are carved a human figure as large as life, with other figures in imitations of beasts and birds."[13]

This form of attached house was the same as that used by the Chilliwack, who also connected their pit houses underground. It is likewise described for the Harrison by Hill-Tout[14] and is the predominant form mentioned for the lower Fraser by Barnett.[15] It differs from the detached house described by Fraser farther up the river (see above). Small detached houses of this latter type were described by an informant, Leo Brown, in 1938 as being the only type used on the Sauk River and the upper reaches of the Skagit River. He said one of these occasionally held four families, many of them were built for two families, and others were so small as to house but one family.

Two types of plank house, the attached and detached, are thus documented at the earliest contact period for the Harrison of the middle Fraser. Whatever its variations may have been, the plank house is well established for the region.

The presence of the pit house in the Harrison region is denied by inference from Teit's statement on the Lower Thompson quoted above and, also by inference, from Ray's distribution map of the Plateau. Yet Indians in the neighborhood of Agassiz in 1945 were perfectly familiar with both pit and plank houses and claimed that the former were used locally for winter houses. In 1938 Peter Pierre, an informant from Port Hammond on the lower Fraser, spoke of pit houses on lower Harrison Lake and at two other places in that general area. He said no pit houses were used as far west as Port Hammond. The same information had been given to Boas before 1890 for in that year he wrote: "It (the pit house) was used by all the Salish tribes of the interior, and spreads as far down Fraser River as the mouth of Harrison River where both the large wooden house of Vancouver Island is built and the subterranean lodge."[16] It seems, therefore, that, despite the presence of the plank house in the Harrison region and inferences of workers in the Plateau to the contrary, the pit house was also used by the Harrison.

Archaeological evidence. With the exception of the work of Strong, Schenck, and Steward in 1924 at the Dalles of the Columbia River, no house sites have been excavated in the northwestern Pacific area. They found evidences of pit houses at two village sites and were able from associated artifacts to date them as wholly prehistoric.[17]

A fourteen month archaeological survey of the upper Columbia written up by Collier, Hudson, and Ford furnishes no information on house types: "Although there is abundant ethnological evidence of the use of pit houses on the upper Columbia, persistent efforts throughout our region have failed to produce any archaeological evidence of pit houses. We are at a loss to explain this failure."[18] Again: "No house structures were found; the only structural remains to throw light on domestic habits were stone hearths and areas of burned stones."[19] Yet the description of their Site 23 includes the following: " . . . There are several saucer-like depressions 15 to 30 feet in diameter. A test pit in one of the larger of these showed burned stone, charcoal, and a deer carpal, but other test pits revealed no evidence of human habitation. Tests adjacent to the depression revealed apparently sterile sand with some river gravel. Hammerstones, scrapers, knives, and points were found on the surface. The depression containing occupational debris may have been a pit house."[20] Farther on, in describing this site in particular reference to pit houses, depressions "15 to 20 feet" in diameter are mentioned but the conclusion is repeated: " . . . this failure to find any evidence of pit houses is surprising and puzzling."[21]

In evaluating these data it should be borne in mind that digging a house site is a different proposition from digging a refuse pit. Pit houses were used over a period of years and care must have been taken to keep them habitable. Informants of the middle Fraser always stress the

[13] Fraser, 1889, p. 197.
[14] Hill-Tout, 1905, pp. 134–5.
[15] Barnett, 1938, pp. 126–7.
[16] Boas, 1890, p. 633.
[17] Strong, Schenck, and Steward, 1930, pp. 29–40.
[18] Collier, Hudson, and Ford, 1942, p. 114.
[19] *Ibid.*, p. 13.
[20] *Ibid.*, p. 24.
[21] *Ibid.*, p. 37.

careful housekeeping involved in pit house living. Mats were often used to cover the floor and refuse was collected in baskets which were emptied each day well beyond the habitation site. The floors of both pit and plank houses were sprinkled and swept daily by good housekeepers and this was said to have been almost mandatory for pit house dwellers. One would be most unlikely, therefore, to find any considerable collection of occupational debris in pit house sites.

Site 23 on the upper Columbia seems clearly to have been a pit house site despite the authors' excessive caution in interpretation. It offered depressions of a size which checks with ethnological information, "occupational debris" within the larger of the depressions, sterile soil surrounding the depressions, and signs of habitation on the surface. With only test pitting it seems impossible to expect more. However, the authors were prevented from further work at the site and nothing is added to our knowledge of house types on the upper Columbia.

Smith found pit house sites on the upper Fraser River in the neighborhood of Lytton[22] and additional, similar sites on the Thompson River above Lytton.[23] His descriptions of these give material paralleling that given above for Site 23 on the upper Columbia.

No archaeological literature exists for the area of the middle Fraser. Our report must depend on brief archaeological work done during an ethnological investigation. In obtaining information on villages, data naturally accumulated on pit house sites; some of these were visited and found in each case to tally with the informants' descriptions. One site, to be discussed more fully below, was not known to our informants but was visited through the courtesy of the McClallums on whose farm near Agassiz it is situated.

The locations of the sites are shown in Figure 68. None of vague provenience were included. There can be no doubt of the identification of the sites; an Indian now living on Seabird Island was raised in a pit house in that neighborhood, and a site just below Spuzzum still had one pit over six feet deep with partially preserved construction timbers. One informant reported that in passing one of the sites near Seabird he noticed several exposed skulls and threw some brush into the pit to cover them. He said he had since learned that the inhabitants of this house had died of smallpox and their bodies had been left untouched because of fear of infection. Incomplete as the list of sites is, their presence corroborates the ethnological evidence and definitely establishes the existence of pit houses in the heart of the middle Fraser region.

FIG. 68. Pithouse sites of the Middle Fraser.

The McClallum site. This site near Agassiz showed a combination of circular and apparently rectangular pits (see Fig. 69). The land was being used as a pasture. It had been lumbered and the smaller trees and brush had later been thrown into the pits and burned. The land had been plowed twice in an attempt to level it. Only one pit had been merely piled with brush and left unplowed; it was circular

[22] Smith, 1900*a*, pp. 130–2; 140–1.
[23] Smith, 1900*b*, pp. 402–5.

and about five feet deep indicating an original pit considerably deeper. In view of the fact that the middle Fraser is just at the dividing line between Interior and Coast Salish the combination of circular and rectangular pits at one site suggested a combination of pit and plank houses. Three days were available for excavation and it was decided to dig the most clearly defined of the rectangular pits.

The site[24] is on a high ridge running north and south at right angles to the Fraser which lies several miles away. It is a mile or so from the lower end of Harrison Lake and the low land below the ridge to the west which is now drained swamp may once have been a slough of the lake. A creek comes in at the outer end of the spur (see Fig. 69) and at the time the site was occupied may have connected the slough with the Fraser. No less than twenty-one house pits remain. All of them are along the steep bank facing the water side of the ridge. Certainly the site must either have been occupied by a large group at one time or have been occupied over a considerable period. Either of these occupations indicates a rich source of marine life near at hand and substantiates the possibility of a water tie at this point between Harrison Lake and the Fraser. Under such conditions the ridge would have been protected at the rear by high land and bordered on the other three sides by water.

The largest rectangular pit was chosen for excavation. It showed no marked outer rim. The corners of the house could only be approximated but were staked out and measured. The dimensions were fifty-seven by thirty feet. The long side of the house paralleled the slough. A cross section of the width is shown in Figure 70 and it was similar throughout. The whole surface slopes here and in ploughing soil has been turned down the slope into the pit.[25] A test pit in the center of the depression yielded no well defined habitation line but showed that the ridge was made up of glacial gravel. According to Mr. McClallum a large boulder had previously been situated at the northwest corner of the depression. Many, perhaps all, of the rectangu-

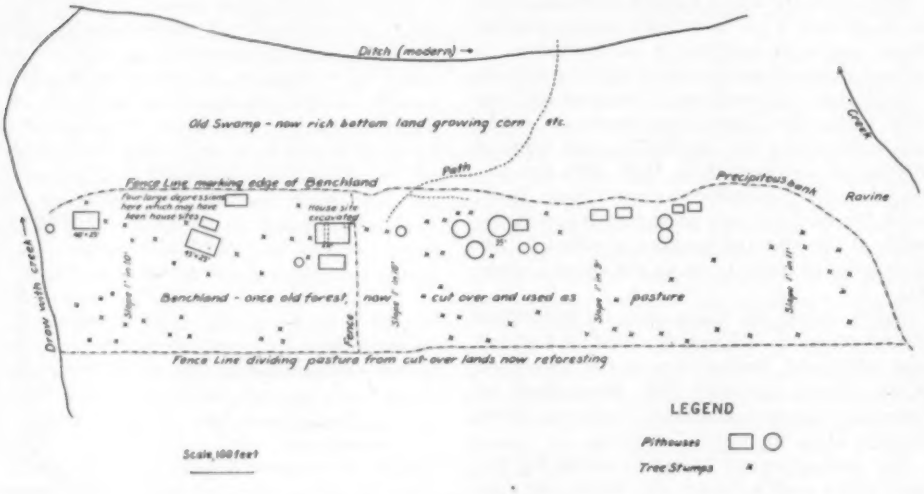
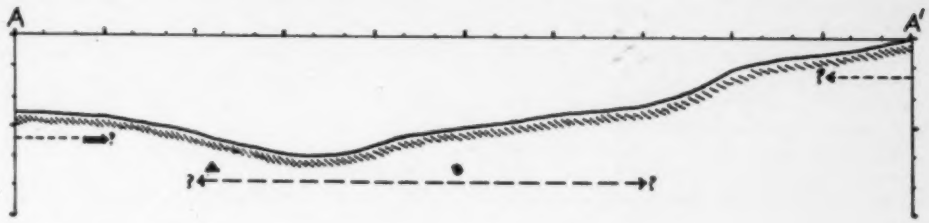

Ditch (modern)
Old Swamp - now rich bottom land growing corn etc.
Fence Line marking edge of Benchland
Path
Precipitous bank
Ravine
Creek
Drain with creek
Four large depressions here which may have been house sites
House site excavated
Benchland - once old forest, now cut over and used as pasture
Fence
Fence Line dividing pasture from cut-over lands now reforesting
LEGEND
Pithouses
Tree Stumps
Scale 100 feet

FIG. 69. McClallum village site, Agassiz, British Columbia.

[24] Mr. A. E. Pickford of the Provincial Museum, Victoria, was with us during the excavation and was kind enough to map the site. Figure 69 is drawn from his map.

[25] Information on plowing, etc., was obtained from Mr. James McClallum whose father first cultivated the farm. Mr. McClallum has been present whenever changes were made on the site's surface. His interest and detailed knowledge proved invaluable and the work could not have been done without his kindness and the friendly interest of his sister, Miss Jane McClallum.



Region of charcoal from recent burning of brush.
Layer showing specks of charcoal; between dirt and clay at A′ end.
Dirt above and sand with stones below.
Wood.
Fire-baked earth.
Fire-cracked (?) rock.

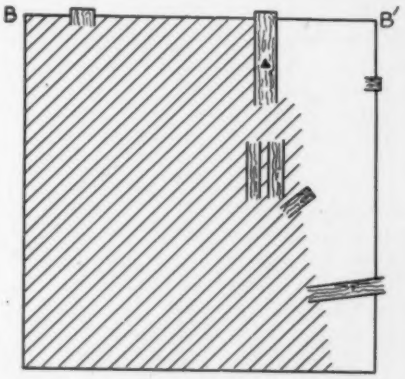
Scale: 1 sq. = 1 ft.

FIG. 70. Cross section of house trench, McClallum site.

lar pits had had similar boulders in the same relative location just outside of the house depression. These must have been carried up from below the ridge, where such boulders occur, and their use remains unknown.

Coast Salish plank dwellings of the proportions of this house ordinarily housed four families, the fires being placed in pairs at one-third and two-third intervals along the lengthwise axis. With the equipment at hand, which consisted only of borrowed trowels and shovels, and with the limited time, it was impossible to attempt complete excavation. A three-foot trench was run across the width of the pit at the one-third mark. It covered the area, AA′A″A‴, three by thirty feet, eight and a half to eleven and a half feet from the north end of the house depression. The trench was worked in sections and it was not possible to get these all to the same depth in the time allotted.

Just below grass root level was a layer of charcoal undoubtedly marking the surface burnings which have been used to clear the land. Well beneath this at both ends of the trench, undisturbed clay flecked with charcoal was reached (see Fig. 70). This level on the west side of the house also yielded fragments of wood eleven to twelve inches below the surface. Toward the center of the depression beneath

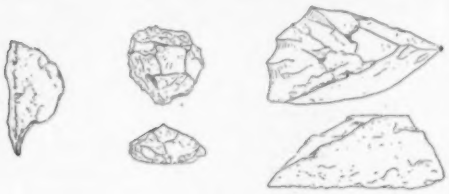


Layer of charcoal.
Pieces of wood, partly burnt. Top surfaces at charcoal level.
Three bits of unusual green stone found just below post.

FIG. 71. View looking down on exposed construction, house corner McClallum house site.

the surface charcoal were large areas of white ash, which also undoubtedly marked burned fill. Mr. McClallum remembered throwing a tree trunk almost two feet in diameter into this pit with the brush. Some baked clay was encountered just below this white ash.

Below the level of the burned fill near the center of the depression was a second, thinner layer containing some white ash and considerable charcoal. At its lower level it was mixed with waterworn pebbles, some of which were five or six inches in diameter, resting on clay. Some of these were cracked, possibly by heat, and between them were occasional spots of baked clay. Glacial gravel began just below. The extent of this area was not discovered and it is impossible to say whether the pebbles represented a hearth or not. But it seems clear that the pebbles had been brought from some other spot, probably the slough.



a b c

FIG. 72. Artifacts from McClallum house site (3/7).

A square at the southwestern corner of the house depression, BB′B″B‴, was also dug. The surface charcoal was again encountered. Beneath this was a soil layer well threaded with living roots but apparently sterile. It was about four inches thick. This sterile layer continued on the south side of the depression to undisturbed clay at eleven to twelve inches below the surface. Over the greater part of the excavated square and beneath the sterile soil was a second clearly defined charcoal layer (see Fig. 71). This charcoal was almost a quarter of an inch thick and was held together by dead grass roots and by fragments of only partially burned wood fiber so that to the north it could be taken out in large slices.[28] It extended beyond the west side of the excavation (BB′). Along the wall of the excavation on this side it could be clearly seen lying in symmetrical four-inch bands slightly tilted from south to north and overlapping where they met. This gave in profile a clear picture of burned overlapping boards and the slice fragments retrieved are so compact that there can be little doubt that the charcoal layer represents the overlapping boards of a former board surface.

What may now be called the board layer rested on a solid block, marked by charcoal, four inches thick and four wide. This extended beyond the side wall of the excavation and on into the house depression. A cut was made through this eight inches from the side of the excavation (BB′), which exposed in the center of the block an unburned core of well preserved wood. The core was apparently the center of a tree whose length ran with the eight-inch length of the block. The cut was about four inches wide and exposed on the other surface two unburned cores separated by charcoal, lying parallel to each other and running in the same direction as the first core. The total width of these and the charcoal surrounding them was eight inches as compared to four in the first. A second cut was made six inches farther along and the same two cores surrounded by charcoal were visible. It is impossible to say how far they extend into the house depression. This second cut also revealed a partially preserved piece of wood coming in at an angle from the south (see Fig. 71) with one of its ends in sterile clay, the other fading into the carbon surrounding the pair of cores. Six or seven inches farther along another piece of wood lay on sterile clay and in the wall near the southwest corner was a similar piece surrounded by sterile soil. This was dug back two and a half inches to sterile soil. All of these pieces were marked on their outer surfaces by burning and all of them were approximately two inches wide by an inch or so thick.

The first well preserved core pulled easily out of the side wall of the excavation exposing sterile clay for about two inches. The end of the block was thus obtained. It was charred only on its lower surface and seemed to have been squared. No signs of bark remained. The piece suggested a small log which had been hewn square. On the same level as this was exposed a second equi-proportioned wood fragment extending back from the west wall of the excavation. The wood was wholly decomposed showing a red powdery substance and with no signs of burning. It extended the same distance into sterile soil as the first but was slightly smaller.

[28] Specimens of this and other materials mentioned are among the archaeological collections of the Department of Anthropology, Columbia University.

The outlines were blurred enough to make it impossible to say whether the original had been square or round. If bark or core had existed neither remained.

In the soil a quarter of an inch below the first block were four spots, an inch or so in diameter and a quarter of an inch thick, of decayed wood. They showed no signs of burning but in other respects were markedly similar to the flecks of charcoal found at the same level, eleven to twelve inches below the surface, at the ends of the trench. No pattern was visible in their placement but they were definitely clustered. The soil was removed two inches below the block and at this level, resting on undisturbed clay, was found a group of three small green stones completely unlike any previously seen on the site. All were smooth but none showed positive signs of human workmanship.

The area around the first block was carefully excavated on the last afternoon but I did the work of the second cut in about twenty minutes while the trench was being filled in. During this time Mr. McClallum was present and he said all of the first block lay below plow level. He suggested that it might be part of one of the large roots of a nearby tree but when the block was removed leaving sterile soil in the direction of the tree this possibility had to be discarded. There seems little doubt that in this corner of excavation the remains of house construction were encountered.

The artifact yield of the site was small, suggesting stone chipping as the main technique. A small scraper (Fig. 72, *b*) was found at the east end of the trench but it was just below the sod within plow depth and cannot surely be placed in association with the house. The trench was dug in three-foot squares and these may be conveniently numbered from one to ten beginning at the east side of the house (along the axis from A to A′; see Fig. 70). Two chipped fragments were found in Square 1 eleven to twelve inches below the surface; a rectangular end scraper (?), a chipped fragment, a core (Fig. 72, *c*), and a possible awl or graver (Fig. 72, *a*) were found at a level three to four inches deeper in Square 3; and in Square 10 a chipped basalt fragment came from eleven to twelve inches below the surface. There were no signs at any point of metal or other material of European derivation.

House types at the McClallum site. The excavation in the southeast corner of the house indicated that the dimensions as measured from estimated corners were just about correct. The first "block" of wood described was clearly a post and was set back beyond the line of measurement so that the house was if anything slightly larger than fifty-seven by thirty feet. Wood was found at the same level at the east end of the trench but not nearly so well preserved, possibly because it seems not to have been burned. The preserved pieces were either totally or partially surrounded by charcoal. The post was burned very little on the end where it had been set in the ground and, from the fact that it was burned at that point only on the bottom side, it may be supposed that the house burned from the inside.

Houses of this area had bed platforms built along the inner walls and the combination of construction posts and boards with the structure of the platforms would account for the large amount of wood found in the house corner. The undisturbed soil found below the post and at either end of the trench was flecked with remains of wood and in each case this soil was the same distance from the present surface, i.e., eleven to twelve inches. It may well have been that the ground just inside the walls was only dug down to hard clay and the pit was dug nearer the center of the house.

A gabled structure on the Nisqually River not far from Tacoma on southern Puget Sound had such construction. It was still standing in 1935 and in describing it I wrote: "The excavation did not begin at the walls themselves and according to the informant's description of 'Indian houses' the floor under the bed platform and for a foot or so beyond was on a level with the outer ground and about two feet higher than the floor in the center of the house."[27] The floor of this house was filled with old straw and hay which was not removed but the large cross beams were less than four feet above ground level at the doorway so the pit must have been at least two feet deep. The ground around the house was perfectly level.

Because it was built on a considerable slope the upper or west side of the house at the McClallum site must have been dug out more than the east or lower side. Square 3 yielded signs of human occupancy and disturbed soil from three to fourteen inches below the level of undisturbed soil at the east side. The depth of the depression in the center indicates that the finished pit was about fifteen inches below the un-

[27] Smith, 1940, p. 286.

disturbed soil at the east side and considerably farther below it at the west side of the house. It was not determined whether the west side offered a sheer pit wall beginning in from the plank wall or was stepped to the center pit in the manner of houses on Vancouver Island. I favor the first possibility.

The pit apparently started at some point between three and six feet from the wall on the east side. Bed platforms in some Salish houses were three feet wide and the people slept parallel to the walls. Bed platforms six feet wide were used in the Chilliwack and Nooksack pit houses described above, the people sleeping with their heads toward the wall, and plank houses of the region also are described with six-foot bed platforms. The platforms in the McClallum house must have been at least as wide as the unexcavated ground left inside the walls and one therefore supposes this house to have had six-foot bed platforms.[28]

The remains of the board layer described must represent either the wall or the fallen roof boards. If it were the wall, the house was built with vertical wall boards. The boards seem to have been narrow, not more than four inches wide, and all of the same width. This suggests that the house was constructed at least in part of shakes. The Nisqually house mentioned above and many old houses of the general area used shakes in their construction. The Harrison today split boards of this width but they do not use purely aboriginal techniques and tools. All early accounts speak of wide planks and it is almost certain that roof boards made before white contact would have been wider than four inches.

The father of the present owners of the McClallum farm was the first European on the land and no house was standing at the site at that time. The house was probably built, therefore, well before 1880. Since narrow boards suggest white contact, whether direct or not, and there were no positive signs of great age, it seems best not to push the date of the house back too far. On the other hand, the evidence of continued manufacture of stone tools suggests an early date. It seems probable that the house was built very early in the contact period. It is the largest at the site and may have been an expression of the prosperity which followed on the first introduction of European goods. It is quite possible that the house was built before settlement reached the middle Fraser Valley. The data certainly do not warrant any final conclusions but, in the absence of better, we may place the McClallum house an an example of a plank house, with associated pit, built in the first quarter of the nineteenth century.

Plank houses are to be expected in the region—more important is the association at the McClallum site of plank houses and deep pit houses. Without further work—and archaeological work is desperately needed in the whole Northwest Coast—it is difficult to say whether the two types were contemporaneous. The one pit house left unfilled has no trees of any size growing among the brush in its pit, nor did it ever have any to the knowledge of Mr. McClallum. Indications are, therefore, against its being of any great antiquity and would tend to place it as roughly contemporaneous with the plank house. Certainly the site combines both types.

Waterman's information was to the effect that the two types were "never found existing together."[29] Although his statement is generally true, it seems clear from both our ethnological and archaeological evidence that pit and plank houses did coexist in the Harrison region.

Pit and plank house types. It is artificial to speak of either pit or plank houses as though examples of them were always identical in construction. The McClallum house seems to have been a detached house; there are no signs at the site of attached houses built in a row, although some of the pits do seem to be grouped together. Mention has already been made of these two types of plank house: a detached type occurring in the first historic record of the region in the neighborhood of Yale, and along the upper reaches of rivers to the south; and a long, attached house with separate living compartments which is mentioned in the same record as occurring below Yale, is given for the Harrison, and is also the dominant type of the lower Fraser.

If we are correct in dating the McClallum house early in the nineteenth century, detached houses are placed at this time in the middle Fraser region on the north side of the river, at Yale, and in the western foothills to the south. Attached houses occur slightly farther west and

[28] The three green stones found beneath the post suggest a child's cache in the space left between the unexcavated ground and the under side of the platform.

[29] Waterman, 1921, p. 31.

center at the mouth of the river. This suggests that the detached form was the older in the region with possible southern ties and that the attached house had come up the river from the coast not many years previous to Fraser's journey. Much is apparently to be learned from a careful check of plank house types.

In one of the first studies of North American house types, Morgan spoke of the "principle of adaptation to *communism in living* . . . extended . . . by the *law of hospitality*"[30] and determining house form. Although few would speak in these terms today, Morgan's idea of the tie between house form and social structure or living conditions would certainly be brought to bear. Goddard[31] used the idea but controlled the data more carefully, keeping within the limits of established relationships, and this is the way it has been used in speaking of house types on Puget Sound just south of our region: "Unsegmented (detached) house constructions were associated with sociological house groups of prime significance in social, ceremonial and economic life, and houses formed of series of family quarters (attached) were associated with greater solidarity and importance of kin lines."[32]

House materials and, more importantly, house form from a purely structural viewpoint, have also served for descriptive accounts. Descriptions of Northwest Coast plank houses have often differentiated between "shed" and "gable" roofs.[33] In his brief study of house types,[34] Madison has found it valuable to describe temporary shelters as well as the more elaborate permanent structures. This seems sound, for variation in structural principle would probably be reflected as much in one as the other.

In Ray's study of the Plateau he makes careful use of structural detail. He describes and maps four general types of pit houses in the Plateau area: a circular pit with pyramidal roof; a circular pit with a conical roof of radiating poles; a circular pit with flat roof; and a circular pit with a conical roof of radiating poles with purlins. There are variants of each of these types, some of them with square pits and varying roofs.[35]

The circular pit with pyramidal roof is given as the exclusive type in the northwest Plateau which borders on the Fraser. This form, according to Ray, is derived from the use of hip rafters with their lower ends resting on the edge of the pit and their upper ends upon vertical supporting posts. In this type the roof opening is formed of four logs, making a square entrance hatch. Three variants are noted. The first is the Shuswap house, beyond the area of our inquiry, which uses six posts instead of four, and thus has six hip rafters forming a hexagonal hatch. The second is the Lillooet house which is more relevant to our problem and in which rafter struts are used sloping diagonally inward from the middle of the rafter to the floor of the pit, with the rafters set in the angle at the bottom edge of the excavation. This results in a squarish floor plan and the hatchway is sometimes rectangular. The third variant is that given for the Okanogan, east of the Thompson, and is similar to the Lillooet house except that the rafters "may have been set at the edge of the pit rather than at the bottom of it."

The Chilliwack and Nooksack house described above had a roof supported by four posts as in Ray's general northwest Plateau type, but other structural features seem reminiscent of his second general type which was distributed through the western Plateau. Either of these Plateau areas is geographically accessible to the Chilliwack. The diagram of a Thompson pit house given by Teit[36] is not cited by Ray, who uses mainly his own extensive and detailed field notes, and it does not seem to fit exactly any of the types described. The pit is shallow and the rafters are supported by rafter struts sloping diagonally inward, as in the Lillooet variant, but the lower ends of the rafters are set on the edge of the pit. In 1808 Fraser saw a pit house in the northern Plateau which was "square below diminishing gradually in size to the top. . . ."[37] This seems to be still another variant, although it might be a form of the Lillooet type with rafters set at the bottom of the pit.

Without wishing to detract in any way from Ray's valuable synthesis of Plateau material, it should be pointed out that this brief use of his pit house types shows them to be less valuable than had been expected. It is not possible, for instance, to determine from them whether

[30] Morgan, 1881, p. 105.
[31] Goddard, 1928.
[32] Smith, 1941, p. 205.
[33] Waterman, 1921; 1924.
[34] Madison, 1925.
[35] Ray, 1939, pp. 132–7.
[36] Teit, 1900, p. 193.
[37] Fraser, 1889, p. 166.

the Chilliwack and Nooksack house has closer affiliations with the Lillooet or western Plateau. I do not believe this means that structural details are unimportant. Quite the contrary. The details have been lost by lumping them together to establish *types* and then describing only the types. Traits isolated from their context are often meaningless, as "square" or "round" houses, and it is a temptation to group factors into units and discuss them as types. As in this case, typing may reveal significant distributions but unless the types are based upon an essential, and demonstrated, unity they are hard to justify. The difficulties following upon the creation of various physical types by the physical anthropologists is a case in point.

The word "type" has been used throughout this paper for want of a better, but it is necessary to avoid using it as a definitive concept. It is not even certain as yet whether pit and plank houses are mutually exclusive types. In fact, conclusions on Asiatic-American ties may hinge on just this point. Olson has phrased the problem as it stands: "Various views are held on the possibility of historic relationship of houses of northwest America and northeast Asia. Steensby thinks it probable that the plank house of America is of Asiatic origin. Jochelson argues for a connection in the case of underground dwellings of the two continents. Waterman, classifying the rectangular plank house as essentially a pit structure, implies that ultimately it comes from the Asiatic underground dwelling through a rebirth in the conical pit structure of the Plateau."[28] The relationship between the pit and plank house types thus assumes major importance.

Pit houses are found in the interior regions of North America and the problem of their relationship to Asiatic structures is complicated by that fact. The area of their distribution comes closest to Asia in the Arctic and along the western fringe of the Plateau. The latter region has been thought of as separated from the Pacific by a solid coastal strip in which only plank houses were built. It now appears that pit houses occurred well west of the Plateau in the area of the middle Fraser.

The importance of this is increased by the further fact that much of the occupied land in the present Fraser Valley is new. Lulu Island at the mouth of the river has largely built up from river silt within the short history of Europeans in the region. As mentioned above, Sumas Lake and the neighboring swamps were drained only recently. The Chilliwack erected villages along the present lower reaches of their river only three generations back; earlier occupation was impossible because of extensive swamp and water areas. The geology of the area should be carefully checked but it seems clear that the land areas of Harrison Lake and the middle Fraser were once in much more direct contact with waters to the west than at the present. Seals still come into Harrison Lake each year.

Pit houses have previously been thought of as entering the region of the middle Fraser by diffusion down the Fraser from Lower Thompson. Our information seems, on the contrary, to establish a well-defined strip of pit houses extending from upper Harrison Lake straight south to the upper reaches of the Chilliwack and Nooksack Rivers. It is probable that the diffusion down the Fraser represents a secondary diffusion and that future discussions of Asiatic-American relations based upon house types will have to take into consideration a distribution of pit houses west of the Plateau and bordering upon waters within each reach of the Pacific.

[28] Olson, 1938, p. 29.

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Columbia University
New York, N. Y.
October, 1946

A. V. KIDDER: THE FIRST VIKING FUND MEDALIST

FOR outstanding contributions to the field of American Archaeology, the Viking Fund Prize and Gold Medal in Archaeology[1] have been awarded to A. V. Kidder, Chairman of the Division of Historical Research of the Carnegie Institution of Washington.

The citation which accompanies the award reads:

To Alfred Vincent Kidder:

Your work at Pecos has been the foundation on which modern field methods have been built. The several Pecos conferences held under your supervision have pointed the way to cooperation and orderly research in the Southwest. Your "Introduction to the Study of Southwestern Archaeology" was the first comprehensive analytical and interpretative study of the archaeology of the Southwest, or of any region in America. The *Papers of the Southwest Expedition*, organized by you, and of which you are author or co-author of four volumes, is the outstanding series on an archaeological site in the American field.

As the head of the Division of Historical Research of the Carnegie Institution, you have developed a broad-scale anthropological program of research in the Maya area. In spite of the great amount of administrative work with which you have been faced, you have maintained a steady production of research papers in the Middle American field.

The Society for American Archaeology is proud to award to you the Viking Fund Prize and Medal for your outstanding work in the field of archaeology, and for your great influence in developing and stimulating individuals and programs of research in American Archaeology.

Kidder's many and varied contributions to his science began in the Southwest, where he went on his first field trip in 1907. His work in northeastern Arizona with S. J. Guernsey helped to clarify the distinctions between Basketmaker and Pueblo horizons. He went to Andover in 1915 to take charge of the Southwest Expedition of the Department of Archaeology of Phillips Academy, now called the Robert S. Peabody Foundation. Excavations at Pecos, initiated in 1915, were continued until 1929, interrupted during 1917 and 1918 by the war from which Kidder returned a Captain of Infantry and a Chevalier, Légion d'Honneur. In 1929 he became Chairman of the Division of Historical Research of the Carnegie Institution of Washington, one of the most important positions in American Archaeology, which he continues to fill.

Stratigraphy as an archaeological technique, conceived in the Old World, and nurtured by Reisner in Egypt, faced its most severe tests in the New World when Kidder started work at Pecos. Nelson's investigations of ruins in the Gallisteo Basin, in New Mexico, began three years before and helped to formulate some of the problems. Hodge's work at Hawikuh was a contemporary venture. Thorough testing at Pecos proved the value of the method which is now the accepted basis for systematic research.

During the years when the Southwest Expedition was in the field, Kidder was responsible for the publication of various volumes of the *Papers of the Southwest Expedition*, including his "Introduction to the Study of Southwestern Archaeology," Guthe's "Pueblo Pottery Making," and Parsons' "Pueblo of Jemez," the last two designed as a background against which results of the excavations could be interpreted. The lucid and matter-of-fact presentation of this material, and the systematic approach, have done much to influence subsequent workers in the field.

Perhaps of even greater importance to the future of Archaeology in the Americas were the gatherings of anthropologists interested in the Southwest. They came to be known as the Pecos Conferences. At these conferences, common problems were discussed, and cooperative methods of research planned. The terminology for the cultural stages which was developed at Pecos, is still in general use, modified to a certain extent by later discoveries. Undoubtedly the underlying philosophy and the systematization of prehistory which were an outgrowth of these conferences have affected the thinking of archaeologists throughout the New World. Similar conferences have been held since then in many different fields of Archaeology.

Kidder left Andover in 1930 to become Chairman of the Division of Historical Re-

[1] Made available for the first time this year, a prize of one thousand dollars and a gold medal will be donated annually by the Viking Fund. Similar prizes and medals are being awarded in the fields of Cultural and Physical Anthropology. Each prize and medal is awarded by a committee of the appropriate society to that person, irrespective of nationality or geographical area in which he practices, who has, in the opinion of the committee, made the outstanding contribution to his branch of anthropology. The committee making the award in Archaeology included D. S. Byers (ex officio), H. B. Collins, G. F. Ekholm, F. Johnson, J. B. Griffin, E. W. Haury, H. O'N. Hencken, T. D. McCown, and G. R. Willey.

Alfred Vincent Kidder

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search, concerned with the history and archaeology of the New World with special emphasis on Middle America. At that time it was felt by many that art and architecture would provide the key to the prehistory of the Maya; restoration of buildings was common practice, and stratigraphy was of importance only as it was evident in architectural details. The striking exception was in the work of Vaillant, trained under Kidder at Pecos, whose trenches through refuse at Chichen Itza in 1926, and whose thesis on the chronological significance of Maya ceramics, completed in 1927, pointed a brilliant spotlight at the weakness in current procedure.

In formulating a program for work in the Middle American field, Kidder has sought to shift the emphasis from the more spectacular side to study of general cultural stratigraphy and sites devoid of pretentious temples and pyramids. Though eschewing the most spectacular as such, he nevertheless has discovered some of the richest finds yet made in American Archaeology, in the tombs at Kaminaljuyu. Methods which he employed, and which his disciple, Vaillant, brought to Mexico, have been the key to our present understanding of the common basis of Middle American cultures.

Throughout his career the quiet reassurance and encouragement which he gives so freely to those who seek his advice have been of inestimable value in developing and stimulating not only individuals, but also programs of research in fields of Archaeology, many of them quite outside the ones in which he specializes.

American archaeologists will find it altogether fitting and proper that the first Viking Fund Prize and Medal be awarded to him.

FACTS AND COMMENTS

DEVELOPMENT OF ARCHITECTURE, CANYON DE CHELLY

During the summer of 1941 the writer made a survey of the sites in Canyon de Chelly National Monument, Arizona, which represent the later phases of Modified Basket Maker and the early phases of the Developmental Pueblo period. The object of this survey was to trace the development of architecture from the early slab-lined pit houses to the above-ground dwellings constructed of linearly-laid stone masonry. Since the writer lacked the facilities for any intensive excavations, the information contained in the paper was on the whole based on surface observation.

Fig. 73. Site below Antelope House, Canyon del Muerto, showing a Pueblo II room superimposed on a Pueblo I pit house.

A typical habitation site of the Modified Basket Makers of Canyon de Chelly is found in the small valley to the east of the National Park Service Headquarters. This site is on the ridge of a small sandy hill, a type of location that appears to have been a favorite choice for house sites of the Modified Basket Makers of the Canyon de Chelly area. The houses were slab-sided and roughly circular in shape. No antechambers were found. One house examined had a diameter of 8′6″ and the floor was 2′6″ below the level of the ground. The floor in some of the houses was made of packed blue clay. No post holes were found, although the lack of sufficient excavation at the site does not make this a significant trait. In the areas intervening between the dwellings were small, slab-sided storage cists and fireplaces. One fireplace averaged 2′6″ in diameter and 1′4″ in depth. Associated with these sites were sherds of the Modified Basket Maker period, that is, Lino Grey and Lino Black on Grey.[1]

Four sites have been found in the Canyon de Chelly area which are representative of the Developmental Pueblo phase. The first in importance for the study of architectural development is a site on the north bank of the arroyo some two miles below Antelope House in Canyon del Muerto. Other sites include the ruins on the ledge to the east of Mummy Cave, a series of pit houses to the southeast of the National Park Service Headquarters, and sites along the south canyon rim near Spider Rock.

The first site mentioned above lies on the left bank of the arroyo facing upstream below Antelope House (Fig. 73). There the stream has cut into the bank and exposed a site that has two, and possibly three, levels of occupation. At the base lies a vertical-laid, slab-sided pit house that is square with rounded corners. The structure measured 9′1″ in length, 8′6″ in width, and the floor was 3′3″ below the surface of the ground. Over the top of the slab-lined foundation was built a small linear masonry wall that now stands 14″ high. The walls completely encircle the slab foundation and apparently stood above the ground, thus making a semi-pit house with a slab foundation and linear masonry walls. This contrasts with the postulated wattle and mud walls of the Modified Basket Maker pit houses. The pottery excavated from this dwelling included two large fragments of Kana-a neck-banded grey ware, many fragments of plain black and plain grey utility ware, and a small piece of typical late Developmental Pueblo (Pueblo II) indented corrugated ware. Thus, with the exception of the latter the sherds all fall into the early phases of Developmental Pueblo (Pueblo I).

In the next level above this dwelling lies another structure, a small slab-sided box that appears to have been a storage bin. It measured 2′6″ high and 2′2″ wide. No sherds were found in this bin to enable the dating of this level. On top of this horizon lies a typical late Developmental Pueblo (Pueblo II) small house site. The houses were built with coursed stone masonry walls set up in conjunction with one another; that is, the same walls were shared by adjacent rooms. A room representative of this group was rectangular and measured 12′ long by 8′3″ wide and had walls that were 8″ thick. A rubble core was used in the construction of the walls. The walls of the rooms gave the appearance of having stood above ground. Features of this room included a small, stone fireplace built above the floor level and a masonry-walled storage bin. Pottery in the room was of the following types: Deadman's Black on White,

[1] Hawley's chart of Southwestern Pottery Types was utilized in establishing the time period for these pottery types. Hawley, 1936, pp. 10–20.

Tusayan Black on Red, and corrugated and plain utility ware—representatives of the late phases of Developmental Pueblo (Pueblo II).

A surface survey of the small house sites near Spider Rock indicated that the houses consisted generally of from six to ten rooms, arranged in a straight line or an L-shape around a small kiva. The sites are reduced to low mounds about three feet high and are covered with the same Developmental Pueblo sherds as found in the Pueblo II level of the Canyon del Muerto site. The walls were all built of linearly-laid stone masonry.

In the Canyon de Chelly area, then, were noted three architectural types corresponding to the recognized Modified Basket Maker and Developmental Pueblo periods (Pueblo I and II). It is noteworthy, however, that these architectural types represent stages in an evolution rather than the abrupt appearance of a new form. In chronological order the types are circular slab-lined semi-pit dwellings with a postulated mud and wattle wall for the Modified Basket Maker period; dwellings with square sides and rounded corners and with coursed masony walls laid on slab foundations for the Pueblo I period; and rectangular dwellings built side by side with coursed masony walls in the Pueblo II period. Thus it is evident that the Pueblo I dwelling represents a transitional form where the wattle and mud walls of the semi-pit house have been replaced by masonry walls with the slab foundation being retained. It is to be noted, then, that stone masonry represents a separate architectural trait and did not enter the area as a part of an architectural complex of which the square masonry-walled dwellings built above ground of Pueblo II are representative.

This slab-lined foundation with masonry-walled dwelling is not confined to the Canyon de Chelly area alone. One of the earliest occurrences has been noted in the Modified Basket Maker sites in the Ackmen-Lowry area of southwestern Colorado[2] (dated 700–860 A.D. from tree ring dates by Martin and Rinaldo[3]). It occurs in structures which are identified as having been granaries and store rooms.[4] The walls of these structures have the coursed masonry laid with abundant mortar, while those of Canyon de Chelly are laid with relatively little mortar. Martin and Rinaldo also note that in the Developmental Pueblo period (Pueblo I), which they estimated to have been from 860–900 A.D., the walls of the above ground rooms were either of slabs which supported rubble walls or upright poles and mud.[5] By the Pueblo II period in southwestern Colorado the houses are built exclusively of masonry and were in groups of from four to ten.[6] Roberts has noted that Houses A and F–I of Shabik'eschee Village, a Modified Basket Maker site in Chaco Canyon, had coursed masonry walls laid on slab foundations.[7] The substructures of Mound BC 50 in Chaco Canyon had this same type of construction. The sherds from these rooms indicate that they were of the early Developmental Pueblo period.[8] Brew has noted at the Pueblo I Site No. 13 of Alkali Ridge, southeastern Utah, similar construction of the walls of the storerooms.[9] The walls differed from those of Canyon de Chelly in that layers of adobe alternated with the layers of coursed masonry. Roberts has noted this type of construction, utilizing alternating layers of adobe, in his Developmental Pueblo village of the Whitewater district in Arizona.[10] Morris has noted the slab foundation, coursed masonry walls in the sites of the La Plata area[11] and Harrington has found the walls of Pueblo Grande, Nevada, to be of the type of construction utilizing the alternating layers of adobe and slab foundation.[12] The writer has observed the walls on sites on the Chupadero Mesa and at the Quarai Ruins of central New Mexico to be of the same construction as the Pueblo I walls of Canyon de Chelly. However, these sites are of late Pueblo III and Pueblo IV in age.

It is noteworthy then that this particular masonry type has been found earliest in the Ackmen-Lowry area of southwestern Colorado and Chaco Canyon in the Modified Basket Maker period, where it is older than its occurrence in the Pueblo I period in the Canyon de Chelly area. This does not in any way indicate, however, that further reconnaisance in Canyon de Chelly may not disclose this type of construction to be present in Modified Basket Maker sites. Field work to date in the Southwest indicates that this type of wall construction apparently was confined in Modified Basket Maker and Pueblo times to the northern part of the Anasazi areas and is not found at a comparable period in either the Hohokam or Mogollon areas to the south where stone masonry did not enter until later.[13] It is possible to postulate that stone masonry was developed outside of the northern Anasazi area and was brought in during Modified Basket Maker times as a part of the cultural complex of the immigrant group which Southwestern archaeologists have postulated as entering the area in the late Modified Basket Maker or early Pueblo I period. Against such a hypothesis, however, is the fact that another area where stone masonry existed at a comparable time period has yet to be found. If Mexico is postulated as the source of stone masonry, it must be explained why this trait is absent in the large Mogollon and Hohokam areas to the south during the early period. Furthermore, many Southwestern archaeologists have recently questioned the existence of any such immigration of new peoples into the Anasazi area during the Modified Basket Maker period or Pueblo I times.[14] From the

[2] Martin and Rinaldo, 1939, p. 460.
[3] *Ibid.*, p. 460.
[4] *Ibid.*, pp. 460–61.
[5] *Ibid.*, p. 463.
[6] *Ibid.*, p. 464.
[7] Roberts, 1929, pp. 15 and 31.
[8] Glenn, 1937, pp. 166–74.
[9] Brew, 1946, p. 161 and Fig. 93.
[10] Roberts, 1939, Pls. 20–2, Fig. 44.
[11] Morris, 1939, p. 58 and Pl. 14.
[12] Harrington, 1927, Pl. XXXV, B.
[13] According to McGregor, stone masonry was introduced into the Hohokam during the Classic Stage, probably as a result of "Salado" influences (McGregor, 1941, p. 175). The Classic Period has been estimated by McGregor to have lasted from 1100 to 1400 A.D.

McGregor states that stone masonry occurred in the Three Circle phase at Starkweather Ruin (McGregor, 1941, p. 197). This phase lasted from 900 to 1100 A.D., according to McGregor.

[14] Brew states regarding this hypothetical invasion, in his summary of the archaeology of the Alkali Ridge area of Southeastern Utah, "The picture does not include at any point the mass invasion of a new people with a radically different culture. . . . Most of the leading Southwestern archaeologists now agree that no such influx took place. At present, in

evidence gathered at present an independent invention of stone masonry in the northern Anasazi area during Modified Basket Maker times seems most probable.

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1945, articles and books are still coming from the pens of archaeologists and their colleagues . . . which consider the so-called Pueblo Invasion of 700 A.D. to be an established fact. It was not so considered by the first excavators and students to note the appearance of cranial deformation in the Southwest, and it is not so considered by many of the active men today." Brew, 1946, p. 290.

AN ABORIGINAL HEMATITE QUARRY IN OAKLAND, CALIFORNIA

At the junction of Redwood Road and Mountain Boulevard in Oakland, California is an outcrop of rock containing hematite which shows signs of having been worked aboriginally. The exposed stratum measures 30 by 20 feet by 6.5 feet at its highest point. Hematite occurs in almost pure form as thin layers in the main body of rock.

Sizeable cavities can be seen at the base of the deposit, indicating where the hematite was chipped out. Fire may have been used as an aid in getting out the ore, this being suggested by the presence of charcoal and smoke blackening. No quarrying tools were found. About 100 yards from the main outcropping is a shallow shaft. Whether this is aboriginal or not is difficult or impossible to determine.

The whole surface of the outcropping is pitted with mortar holes, indicating that the ore was not only mined here but also ground into powder on the spot. Eighteen mortar holes are visible on the west side of the deposit, two on the east. The largest is 13 inches wide with a depth of 14 inches, the smallest measures only 4.5 inches in diameter and 3 inches deep. Small fragments of hematite still adhere to the sides and bottoms of some mortar holes.

No evidence of settlement are noticeable in the immediate vicinity of the quarry, although local tradition has it that at one time this was an encampment where "Indians had their council fires and did their cookery." A former owner of the property is said to have found Indian "relics" at the spot. Actually a habitation site may exist but its detection is difficult because the area is now heavily wooded with eucalyptus trees which cover the ground thickly with fallen leaves, bark, and branches.

The quarry is of interest because it may have been one of the principal sources of pigment for the region. Lower level burials in the shellmounds around San Francisco Bay are often liberally sprinkled with "red ocher" and red pigment is found scattered throughout the sites.[1] Part of this is probably cinnabar from the famous New Almaden mines near San Jose, California but most of it is hematite. No other worked hematite deposits have been noted in the bay region, the nearest being at Petaluma about 50 miles away. In all, twelve aboriginal hematite quarries have been located in California, one in the northeastern part of the state, four in central California, and the remainder in the south.[2]

The use of hematite prehistorically has been reported for a number of districts in California. It is found in the Emeryville, Ellis Landing, and Stege mounds on San Francisco Bay and north of the Bay in a number of Marin County sites. In the lower Sacramento Valley it is found in Early sites and more abundantly in Transitional ones. It has also been reported from the San Joaquin Valley and Santa Barbara regions. Historically it was extensively used for face

[1] Max Uhle, "The Emeryville Shellmound," *University of California Publications in American Archaeology and Ethnology*, Vol. 7, No. 1, Berkeley, 1907; Egbert Schenck, "The Emeryville Shellmound, Final Report," *Idem.*, Vol. 23, No. 3, Berkeley, 1926; N. C. Nelson, "The Ellis Landing Shellmound," *Idem.*, Vol. 7, No. 5, Berkeley, 1910.

[2] R. F. Heizer and A. E. Treganza, "Mines and Quarries of the Indians of California," *California Journal of Mines and Geology*, July, 1944, pp. 291–359.

and body painting and in decorating utensils and other items. Its utilization in connection with burial was not frequent, however.

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MANIFESTATIONS OF A SOUTH FLORIDA CULT IN NORTHWESTERN FLORIDA*

A number of unusual ornaments of gold and copper were found several years ago in a site on Apalachee Bay, Wakulla County, Florida (Fig. 74).[1] This site lies in the St. Marks National Wildlife Refuge a few hundred feet east of its lookout tower, several hundred yards south of the headquarters, and a mile northwest of the St. Marks lighthouse. The site is a burial ground, showing no signs of habitation other than some sherds and flakes of chert scattered on the surface. The burials are found close under the sandy surface on a small natural ridge which lies along the shore where high land merges into extensive marshes. Nearby are two other sites, both shallow refuse areas. One lies about 150 yards to the west, near the gate of the present lookout tower.[2] The other is under the buildings of the present refuge headquarters.[3]

The burial site was apparently discovered by amateur archaeologists, and one in particular, Bill Carey of Tallahassee, obtained numerous specimens here about ten years ago. Information concerning their mode of occurrence is not complete, but the artifacts apparently were grave objects. It is not known whether they were found with one or several burials. The objects include a circular gold ornament, a copper crested bird ornament, a decorated copper plate, an embossed copper gorget, a plain copper gorget, a silver and a copper bead, and European objects including a mordaunt, glass beads, and trade bells.

About the time these finds were made, Montague Tallant of Manatee, Florida visited the site, obtaining additional grave objects. These included a gold disk with an embossed rosette design and a copper ceremonial tablet. He also reports the finding of a stone celt about 37 cm. long. Other objects, including some made from gold, have been reported from here but I have not seen them.

The specimens obtained by Bill Carey have been in the possession of David O. True of Miami, but the gold specimen was recently sold by him to a commercial Indian relic dealer. Since it is quite possible that this ornament and other objects may not again come to the attention of professional archaeologists, a description, based on notes made while the specimens were in Mr. True's possession, is presented here.

The gold ornament is circular with a diameter of 5.8 cm. (Fig. 75, *a*). It has been hammered out of a thicker piece of gold, to make a thin sheet, which was then shaped. Evidence of this working may be seen in several small cracks in the surface. The central part of the ornament has been raised into a large boss, about 1.7 cm. higher than the rim. In the center is a perforation 1 cm. in diameter. Around the narrow flat rim or edge of the specimen are sixteen small

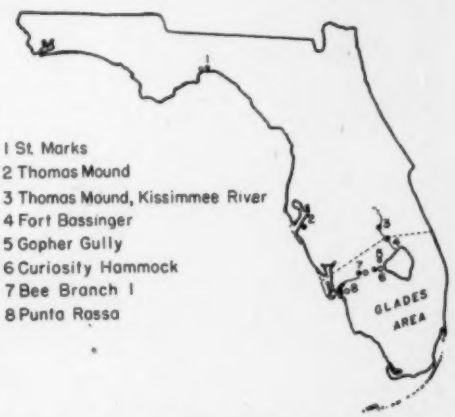

FIG. 74. Map of Florida showing the distribution of crested bird ornaments and ceremonial tablets. The occurrence of crested bird ornaments is indicated on the map by open circles, the presence of ceremonial tablets by solid circles.

bosses. Every other boss is joined to the central perforation by a narrow embossed ridge. The whole surface is well smoothed and polished. The weight is 16 pennyweights. Presumably this specimen once had a wooden backing and perhaps the central perforation was formerly covered by a small button of contrasting metal, as is the case with some specimens from southern Florida.

The crested bird ornament is a figure of a head cut out of sheet copper and incised with deep lines which reproduce similar features on each side (Fig. 75, *f*).[4] Its length is 28 cm. with a thickness of about 0.5 mm. The exact identification of the bird represented has not been made, but it has been suggested that it is an ivory-billed woodpecker. Associated with this ornament is a small embossed circular disk of gold, 1.3 cm. in diameter, which apparently was

* This site was visited and various collections were examined as part of the work of the Yale Caribbean Program. I wish to thank David O. True for permission to study his specimens. John W. Griffin, archaeologist for the Florida Park Service, and his assistant, Hale G. Smith, kindly took me to the site in the summer of 1946, and later furnished information concerning sherds collected. Montague Tallant gave helpful data on his specimens from there. I also want to thank Richard F. Deckert, who drew the gold ornament and the crested bird ornament, and Vera M. Masius, who drew the other figures from sketches made by Dorothy F. Goggin.

[1] Site Wk 11 of the Florida Park Service Archaeological Survey. This site does not seem to have attracted the attention of any archaeologist previous to these finds. Clarence B. Moore (1902, p. 320) excavated a burial mound of the Weeden Island culture about two miles northeast of the lighthouse and noted considerable shell deposits in the neighborhood. Willey's survey also carried him into the vicinity of the site, but he apparently did not hear of its nature or presence (Willey and Woodbury, 1942, p. 246).

[2] Site Wk 2, Florida Park Service Archaeological Survey.

[3] This midden area has been briefly noted by Bellamy (1940).

[4] A closely similar specimen of gold is illustrated by Rau (1878). Other examples are illustrated by the writer (Goggin, 1947).

cemented to the specimen forming an eye of contrasting color. Since the specimen was made, a small hole has eroded beneath the eye.

A copper plate ornamented by incision has human and animal figures depicted on the surface.[5] This was found in a fragmentary condition.

The copper gorget is a large rectangular specimen made of sheet metal (Fig. 75, *d*). It measures 8.8 by 18 cm. A row of small bosses 5 to 8 mm. in diameter line the edge, with another row cutting across the middle, dividing the gorget into two parts. In the center of each half is a large boss 5.5 cm. in diameter and 1.5 cm. in height. Two small perforations 2 cm. apart in the center of one end probably served for suspension. Another copper gorget or pendant is fragmentary (Fig. 75, *c*). It is 12 cm. long, and narrow, tapering from 4.4 cm. at the wide end to about 3.2 cm. at the broken end. Possibly the complete specimen was triangular. There are two small holes at the wide end.

Indian-made metal beads include a small, short, tubular bead of silver, 5 mm. long and 5 mm. in diameter. An unusual globular bead of copper is 9 mm. in diameter and 6 mm. long (Fig. 75, *e*). It is solid, with a small perforation, and an incised spiral decoration on the surface. It is possible that this was not a locally made bead.

European material associated with the metal objects of Indian manufacture includes a cast brass or bronze mordaunt 6 cm. long (Fig. 75, *b*).[6] Glass beads found appear to have been burned and are markedly discolored. Of the

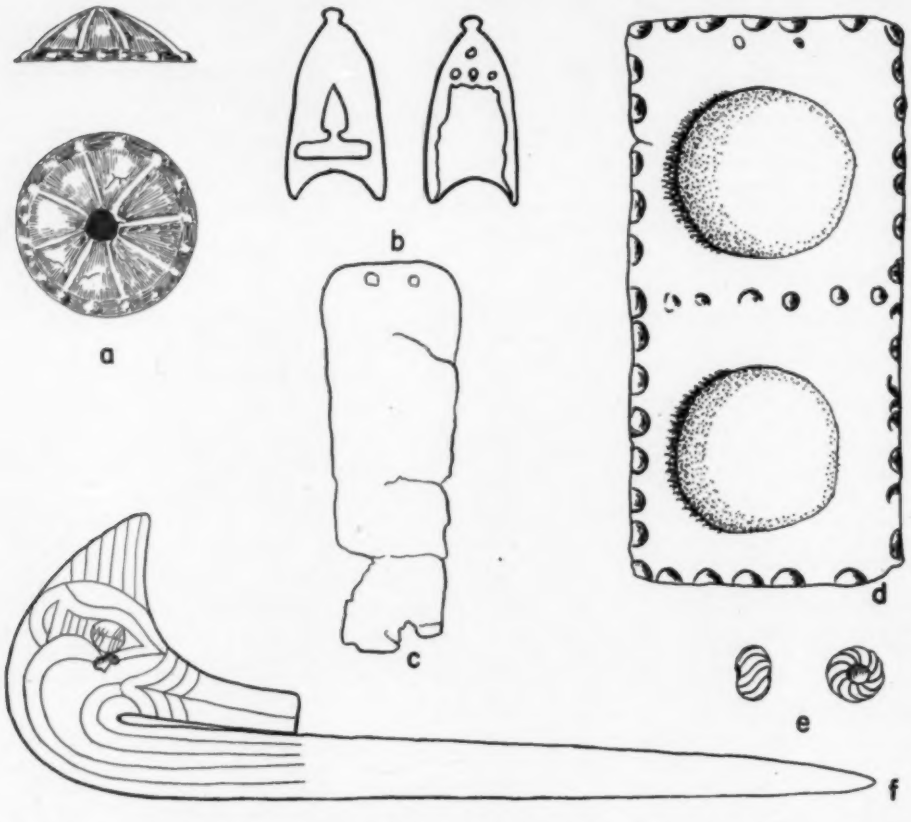

FIG. 75.—Specimens from St. Marks National Wildlife Refuge. *a*, full and profile view of gold ornament; *b*, front and back view of European mordaunt; *c*, triangular copper gorget or pendant; *d*, copper gorget with two large bosses; *e*, profile and full view of copper bead; *f*, crested copper bird ornament. Bead is full size; all others are ½.

[5] According to David O. True this specimen is now in the possession of Arthur Pancoast of Miami Beach. I have not seen it.

[6] This has been dated by Mr. Stephen V. Grancsay of the Metropolitan Museum of Art, New York, as being from the first half of the sixteenth century (personal communication to David O. True, October 22, 1946).

specimens seen, the rare star or chevron, multilayered form is most common with ranges in size from 5 to 10 mm. in diameter. Round and square shapes are present in the series. Other beads include small blue seed forms and long (1 cm.) black oval beads with a spiral white inlay. Brass trade bells are 3.2 cm. in diameter, and globular in shape with an eyelet for attachment. A small ridge encircles the middle. Two holes connected by a slot are on the bottom. A number of melted droplets of brass complete the objects seen.

It was not possible to examine closely the specimens obtained by Montague Tallant, but the gold rosette patterned disk is like specimens from Punta Rassa in southern Florida.[7] The copper ceremonial tablet is a slight variant, but is certainly close to the usual form.[8] The major difference is that the central perforations are rectangular rather than square.

In a recent visit to the site with John W. Griffin and Hale G. Smith, potsherds were collected on the surface.[9] These were all of a heavily grit-tempered ware and were mostly plain. None of the types are readily identifiable, but some are probably Wakulla Check Stamped. A small sherd may be Swift Creek Complicated Stamped. Fort Walton material, surprisingly enough, does not appear to be represented unless two sherds with punctates below the lip belong to that type. Other sherds include a linear check stamped form and a couple of fragments with one and two incised lines respectively.

A small additional sherd collection was made at Site Wk 2, immediately to the west. This material included plain pottery, linear check stamped pottery, and Swift Creek Complicated Stamped (?) sherds. These are also a grit-tempered ware.

Pottery is usually very helpful as a means of dating sites, but in this case, we find it difficult to place our burial site in the chronological framework of the northwest Florida Coast. The historic European objects indicate the latest time of occupation in the region, known as the Fort Walton period. The pottery, however, does not support this, as only two questionable Fort Walton sherds were found. Wakulla Check Stamped is also a poor diagnostic, for while it does extend for a short distance into the Fort Walton period, it is mainly characteristic of Weeden Island II period.[10] The possible Swift Creek Complicated sherds are a still earlier type, extending from Santa Rosa-Swift Creek times into early Weeden Island II.[10] In view of this confusing picture, it appears that habitation at the site may have been long and sporadic, and have had no direct relation to the burials.

The gold ornament and the associated artifacts are of general interest for two reasons. One is that at least two of the objects, and perhaps more, are thought by some to be components of the artifact complex of the Florida variant of the Southern or "Buzzard" Cult. However, until the exact position of these is better known, further discussion of the significance of their presence here in terms of the Southern Cult is premature.

Perhaps of greater interest, at least to Florida archaeologists, is the fact that this group of metal objects represents the most northern and isolated occurrence of some of the more spectacular artifacts typical of the Glades Area, the culturally distinct region occupying the southernmost portion of the state (Fig. 74). The crested bird ornament is the only known specimen from outside the Glades Area, and the ceremonial tablet is one of the few found outside the area. The two gold ornaments are forms most common in southern Florida, and typical of that region, although occasional examples occur outside the Glades Area. The double bossed copper gorget is also a form of the Glades Area, where it is found in gold.

The group as a whole, then, would appear to be derived from the Glades Area, where most of the specimens represent ornaments developed in the sixteenth century after copper, silver, and gold were obtained from numerous wrecks. The crested bird ornament is considered to be an object of ceremonial significance, possibly a cult symbol. The ceremonial tablet is also thought to be a cult object, for its distinctive form and design, which are most commonly reproduced in small metal specimens, occur also in stone and in much larger wooden examples.[11]

In any case, the relatively large amount of Glades Area objects, both ornamental and ceremonial, must be regarded as intrusive. Do they represent trade or the expansion of a cult movement northwards? This is hard to answer, but we do know that the Calusa, who were probably the possessors of the archaeological cult material in the Glades Area, had much cultural contact with the Gulf Coast areas in late times. It is also believed that linguisticially they were most closely related, outside of southern Florida, to the Apalachee who occupied the area in which this site is located.[12] If a local cult developed in southern Florida, inspired by stimulus diffusion from the major Southern Cult, it is not surprising that it, too, would spread in the usual messianistic fashion with the full accompaniment of paraphernalia. Any spread of cult ideas from southern Florida would be expected to follow the usual channels of trade or cultural movement, in this case up the Gulf Coast, eventually reaching Apalachee Bay.

Detailed data concerning these cult objects in other parts of Florida are not available, but scanty information suggests that the above postulation may be true. Typical examples of the ceremonial tablet are found outside the Glades Area at only two other sites. One is the Thomas Mound on the Kissimmee River, only twenty miles north of the uncertain northern boundary of the Glades Area (Fig. 74).[13] The other specimen is definitely in a different cultural setting, occurring at the Thomas Mound in Hills-

[7] Illustrated in Goggin, 1947.

[8] This is another object typical of southern Florida. Specimens are illustrated by Griffin (1946). A larger series is shown and discussed in a paper of the writer (Goggin, 1947).

[9] Specimens in Yale Peabody Museum and the Florida Park Service Archaeological Survey collection.

[10] Willey and Woodbury, 1942, p. 237.

[11] There are a number of objects in the Glades Area which may possibly be assigned to this cult, but as a rule few of each form are known. The crested bird ornament and the metal ceremonial tablet are the only objects which occur in any numbers. Seven crested bird ornaments and six metal ceremonial tablets have been found in the Glades Area, and three sites have yielded examples of both.

[12] Swanton, 1946, p. 801.

[13] Specimen in the collection of Montague Tallant.

borough County (Fig. 74).[14] This is directly on the line of communication between the Glades Area and the St. Marks site.[15]

In summary, we can state that there was found in a site near St. Marks lighthouse, Wakulla County, Florida, a group of metal objects whose origin was probably in the Glades Area of southern Florida. It is possible that some of these were cult objects of that area, but it is as yet impossible to decide what their presence at this site indicates. They may have been traded as mere metal ornaments or may represent the presence of a Glades Area cult in northwestern Florida.

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[14] Specimen in the Florida Geological Survey collection.

[15] Since this paper has gone to press, John W. Griffin reports the finding of a silver ceremonial tablet in a historical burial mound south of Sebring, not far north of the Glades Area (Griffin and Smith, n.d.).

BOOK REVIEWS

Apes, Giants and Man. FRANZ WEIDENREICH. Chicago: University of Chicago Press, 1946. vii+122 pages, 90 text figures, $2.50.

In recent years Dr. Weidenreich has been contributing a series of ideas which supplement or contradict many of the beliefs about human and racial history which have been current in this country, and which stem largely from Sir Arthur Keith. Dr. Weidenreich's ideas are important, and form a general structure, but the individual monographs in which he has expounded them will not have been read by non-specialists. They are presented in outline form in this book, which is the publication of five lectures made by him at the University of California as Hitchcock Professor, and it is therefore a very useful book indeed.

It is now possible, says Dr. Weidenreich, to trace fossils of human morphology back from the large *Pithecanthropus* (IV, which he has named "*robustus*") as a connected line through the Javanese *Meganthropus* mandible to the colossal *Gigantopithecus* teeth of South China. This series indicates an actual giant stage in the ancestry of modern man; and this fact, with details of the canine and premolar group, further indicates that the line giving rise to the giant human stage was early independent of the main anthropoid group and was not derived from the principal known Miocene apes, i.e., *Dryopithecus* and *Sivapithecus*. Furthermore,the now ample Pleistocene fossil human material varies in form in different parts of the Old World but falls into broad developmental stages, which he names *Archanthropinae* (*Pithecanthropus* and *Sinanthropus*, with Solo as a later form of the first), *Paleoanthropinae* (the cave Neanderthals, the Mt. Carmel types, etc., and the Rhodesian skull) and *Neoanthropinae* (*Homo sapiens*). Distinct lines evolved, in isolation but in parallel, upward through these stages, all arriving independently at the final stage of *Homo sapiens*, and this is the basic cause of racial differences in man today. That is to say, *Pithecanthropus* led to the Australians via Solo and Wadjak, *Sinanthropus* to the Monogloids, Rhodesian Man (following Keith) to living races of South Africa, and the earlier Neanderthals to the Europeans. All fossil lines underwent the same evolutionary stages; hence *Homo sapiens* is not an ancient, independent type, and no known fossil forms can be excluded from the ancestry of some or other of the living men.

A principal impulse for these changes was the brain, because, compared to his ape cousins, man with his disproportionately large brain is actually analogous to the dwarf forms of other mammal families, in whom the brain is also disproportionately large and who show a differentiation in skull form and a reduction of the jaws like that of man, and so serve to explain in part these features in the human line. A final development, the tendency toward brachycephaly in modern man, is probably a further adjustment to the erect posture.

There are serious objections to some of the above. By the exigencies of his hypothesis of parallel stages in multiple lines, Dr. Weidenreich is forced to make chronological considerations subservient to morphological ones, just as he is forced to annihilate *Eoanthropus*, whether he wants to or not. But the points any particular reviewer might choose for attack are neither here nor there. Even if Dr. Weidenreich's main theses turn out to be mistaken, they are going to have pronounced and lasting effects on thinking about early man, and every archaeologist is herewith advised to read Dr. Weidenreich's book with attention.

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Excavations at Tampico and Panuco in the Huasteca, Mexico. GORDON F. EKHOLM. Anthropological Papers of the American Musum of Natural History, Vol. 38, Pt. 5, pp. 321–512. New York, 1944.

Dr. Ekholm found at Panuco a deposit 6.5 meters deep formed during a seemingly continuous occupation lasting from the earliest defined Middle American horizon until modern times. By intelligent analysis of some 34,596 potsherds recovered from this archaeological goldmine, supplemented by various excavations in the area during a field season, he has described six well-documented ceramic periods. In spite of the absence of identifiable trade ware, the periods have been reliably related chronologically to the better known cultures through trait resemblances in the pottery recovered.

This study, by providing the first well-founded culture sequence described from the Huastec area, should allow the chronological placement of much hitherto undocumented material. It forms a chronological framework in which all future work in the area can be placed.

Periods are named Huasteca I through VI. Periods I and II show traits suggesting that they equate with the first two periods at Uaxactun and with the first two periods at Monte Alban. Period III equates with Teotihuacan II and III; Period V with the Aztec I-Mazapan culture; Period VI with Aztec III. The southern affiliations of Huasteca I and II suggest a considerable extension of the rather homogeneous early culture area which seems to have extended from Honduras through the Maya lowland area and up the East Mexican coast. Ekholm suggests very reasonably that the Maya affiliation of the Huastec language dates from this early period since cultural connections after Huasteca II were nearly exclusively with the Mexican mainland, and none of the several diagnostic culture traits developed later in the Maya area occur in the Huastec archaeological material.

The ceramic descriptions are clear and excellently illustrated. The major diagnostic ceramic wares have been given binominal names, a proper name followed by a descriptive term in the form general in Southwestern archaeology. Ekholm has designated his rarer and significant variants by simple descriptive terms such as Purple on Brown. This procedure seems the best method of avoiding the excessive pottery nomenclature which has plagued Southwestern archaeology, without at the same time forfeiting the advantages of definite names and descriptions for the diagnostic ceramics of the area.

The progressive change in ceramics through the strati-

graphic column is documented in a table, and the periods have been defined as levels in the type trench and secondarily described by their characteristic ceramic types. This procedure leaves undistorted the record of gradual uneven change in the ceramics, leaving open the way for later definition of any subperiods or transitional stages shown by later work. Good illustrations of figurines and other associated artifacts carefully documented are included. Few data have been lost in the classification process.

The excavation of a site at Tampico uncovered a series of superimposed plaster-faced conical adobe building platforms which were the most unusual of the architectural finds of the season. Ekholm places this type of structure in Huasteca V and VI and believes that these platforms supported temples. Architectural finds from the other excavations and a survey of ruin groups leads him to conclude that round structures are more abundant than square or rectangular structures in the area, and are commoner there than anywhere else in Middle America. There is probable evidence of a circular platform in Huasteca II and such structures continued to be built during later periods. This makes it likely that such structures originated and were developed in the Huasteca.

In his concluding section Ekholm remarks on certain general similarities between his Tancol Complex pottery, which equates with Huastec II, and Southeastern ceramics and promises discussion in a later paper. The demonstration of cultural contacts between these two regions at the early period indicated would add very considerably to our knowledge of New World prehistory.

Through the discovery of a deposit showing perhaps the longest continued occupation found yet in Middle America, and through an intelligent and sensitive handling of his material, Dr. Ekholm has produced a report of outstanding value.

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Excavations in Northern Chile. JUNIUS B. BIRD. Anthropological Papers of the American Museum of Natural History, Vol. 38, Pt. 4, pp. 170–320. New York, 1943.

The monograph under review is a detailed account of the excavations made by Junius Bird, under the auspices of the American Museum of Natural History, in the shell middens along the north coast of Chile from Arica to Coquimbo during the year 1941. Although several cemeteries were dug at various sites along the coast, the main body of the report is concerned with the more important data uncovered in the shell mounds excavated at Arica, Punta Pichalo near Pisagua, Taltal, Coquimbo, and La Serena. Before going into the descriptions of the sites, Bird devotes a small section to the "Climate and Topography and its Effect on Life in Northern Chile" by way of introduction to a better understanding of the life of the peoples who occupied the middens.

The first large excavations were at Playa Miller in the Arica area and dealt entirely with a pottery horizon. Although the material is adequately described and an excellent series of graphic charts (Table 1) present the pottery analysis in a clear manner, a more complete comparative discussion of the significance of these ceramic styles could be presented. The short-comings of this section result from the fact that the basic part of the report was prepared under field conditions without access to specimens from adjacent areas or to recent literature. It was completed in New York while the collections were still in Chile.

The ceramic sequence seems to indicate that no Tiahuanaco or Tiahuanaco-influenced period is present at Playa Miller; instead, typical Atacameño ware (large water jars with designs executed in black-on-white and black-and-red-on-white) is common at the bottom of the midden and continues to the surface. Contemporaneous with this material are sherds which show Atacameño characteristics influenced by Chincha designs from Peru. If Bird's sequence here at Arica represents the entire period in which decorated pottery was used in north Chile, then the existing theories on sequence will have to be modified, or Arica will have to be omitted until further work in ceramic stratigraphy is done in north Chile.

Since Bird's main problem was to define the earlier, pre-pottery horizons in Chile, the majority of the report is devoted to such discussions, with ceramic sequence and cemetery associations described only when encountered in excavation. The first site that indicated the presence of a pre-pottery people was Quiani, south of Arica. Here the midden showed continuous occupation without the use of pottery until after the introduction of agriculture. The site had apparently been abandoned before the use of pottery and true weaving. Excellent pressure-flaked stone tools characterized these early inhabitants. The distinctive artifacts defining the lower levels are the *choro* mussel shell fish-hook and composite sinker-hook. The upper levels presented bola weights, cigar-shaped stone fish-line sinkers, thorn fish-hooks replacing shell ones, bone fish harpoons, knotted cord bags—all items not found in the earlier debris. This material continued in use for a long time until the introduction of corn, gourds, and cotton. Pottery remains absent during this agricultural horizon. Although graves were uncovered at Quiani, they had too few items in common with the midden to establish their relationship. The Playa Miller midden, in which the painted pottery sequence was encountered, is of importance in that it continues the sequence in the Arica area into the pottery-using period. Evidence of the pre-pottery period was also present in the Playa Miller midden, but a failure to find characteristic objects prevented a correlation of the Playa Miller and Quiani middens.

With a definition of what was to be expected in the early pre-pottery horizons, Bird continued his survey southward, placing his next large stratigraphic test in Punta Pichalo near Pisagua. As with all of Bird's descriptive analyses, a wealth of good illustrations permits the reader to form a clear idea of the type of artifacts encountered in each period. A series of detailed drawings of each stratigraphic block defines the nature of the debris and cultural divisions. However, the Punta Pichalo diagram, "Figure 24, Structure and Plan of Test Block, as Exposed on Four Faces, Punta Pichalo" (p. 257), has an error in drafting or labeling which is misleading and would cause misinterpretation of the data

as found in the ground. The cultural divisions are designated in the Key as: I, First Pre-Pottery Period (shell fish-hook culture); II, Second Pre-Pottery Period; III, First Agricultural Period. However, in the sketch the upper levels (A–B) are shown as I, and the lower levels (J–N) as III, which places the First Pre-Pottery Period (shell fish-hook) on the top of the mound and the Agricultural Period in the lower levels of the midden. By correcting the divisions *on the drawing* to read Cultural Division III from levels A–B (upper part of the block) and Cultural Division I from levels J–N, leaving Cultural Division II as indicated, the diagram agrees with the Key. Then the interpretation of the cultural divisions from the shell fish-hook culture in the bottom of the midden to the First Agricultural Period in the top of the mound is correct. In the text the cultural divisions (sometimes called "layers" by Bird) have been correctly designated as indicated by the Key of Figure 24 and no confusion arises from the discussion found in the concluding remarks about this midden on pages 275–7.

A sufficient number of artifacts were taken from the Pichalo midden to confirm and amplify the Arica observations that "shell fishhooks were so characteristic a feature that we can justifiably refer to this pre-pottery division as the shell fishhook period." Between the top of Cultural Division I (shell fish-hook period) and the appearance of pottery, a second cultural division occurs that contains the same type of artifacts found following the shell fish-hook period at Quiani, Arica. This division was called the Second Pre-Pottery Period (Cultural Division II as defined in the midden and all diagrams). The introduction of pottery marks another clear-cut cultural change as it was accompanied by true weaving, coiled basketry, and agriculture.

Still seeking further evidence to confirm the pre-pottery sequences, Bird moved south to Taltal. Although slight variations occur in the diagnostic artifacts (shell fish-hooks, fish-line sinkers, composite sinker-hooks and harpoons) the same basic materials were found here as in the other two excavations. Here the archaeological problem is confused by the abundance of coarse stone implements, made and used coincidentally with good pressure flaking. However, analysis of this coarse stone work does not give sufficient evidence to show a strictly percussion-technique period at Taltal. The tests at Taltal show a cultural history that was perhaps more stable than that of either Arica or Pichalo, with material corresponding to that of the other two middens in the lower levels, but with less variety in form. A ceramic period of occupation was not clearly defined in the Taltal excavations.

The work of Junius Bird in his Chilean excavations supplies much needed data on the cultural history of the west coast of South America. In Chile he clearly defined the early pre-pottery cultures and their characteristic traits, showing that the makers of the shell fish-hooks were the people who started the permanent occupation of the north coast of Chile. This well-presented and excellently-illustrated report is the prelude to further significant work that Bird is now carrying out on the pre-pottery cultures of the north coast of Peru.

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Tree Ring Studies in North Dakota. GEORGE F. WILL. Bulletin, Agricultural Experiment Station, North Dakota Agricultural College, No. 338. Fargo, N. D., 1946. 24 pages, 2 maps, 6 figures.

Will and Spinden distinguished themselves, while yet undergraduates, with the first anthropological study in North Dakota, which brought together all that was then known of the history, ethnology, linguistics, physical anthropology, and the archaeology of the Mandans.

As Strong has well said, "This monograph, 'The Mandans, a Study of their Culture, Archaeology and Language' still stands unique."

In the present *Bulletin*, Dr. Will, most of whose life effort has been devoted to the betterment of seed grains and the advance of agricultural production, has used his high talents as an archaeologist and his infinite patience with necessary details, to accomplish a result of supreme importance to the people, not alone of North Dakota, but to all who farm and to all those dependent on farming in the Great Plains.

The great flood of homesteaders settled in North Dakota in 1880. For several years their wheat crops were enormous. Then came droughts, and by 1887 the less thrifty, and those of little courage, had deserted the land and gone "back east" from whence they came, or moved to the far west.

A more severe and prolonged drought was that of the 1930's. However, fewer people deserted their farms.

Moved by the desire to date some of the hundred or so villages of the Mandans, Arikara, and Hidatsa along the Missouri, Dr. Will started many years ago to procure the remains of logs which had formed the central four posts of their earth lodges. Over sixty cross sections were secured. Nearly all were of burr oak.

Search was then made for a living burr oak, and two were found and felled in 1940. One of these became the "Master Oak." It showed an age of 373 years.

A chart of the Master Oak was made by the Douglass system. Similar charts were then made of many post remnants and cross sections which had been gathered.

These were checked against rainfall data in the U. S. Department of Agriculture publication, "Crop Yields and Weather." The two charts corresponded in nearly seventy-five per cent of the years covered.

Then the charts of the posts were compared with the master chart beginning with those from the most recent site. After this youngest site had been linked up with the master chart, comparisons were made with charts from older sites. This procedure was followed until one section was found where the sprouting date of the tree was 1406.

Study of the width of the tree rings both by Will and Gila Pueblo Tree Ring Laboratory, Santa Barbara, California, gives records of precipitation. This record is established for 536 years.

Will then discusses each village from which cross sections of logs were secured, giving the dates of the earliest and the latest cuttings. The results confirmed his classification of these villages as to age as given in the *North Dakota Historical Quarterly*, Vol. XI, Nos. 1 and 2, 1944.

The end result is that the Mandan Indians "occupied the area at a much earlier date than had previously been supposed. We have the story of a successful occupation of

this area along the Missouri by an agricultural population for a period *many times longer than that of our own white race.*"

Dr. Will sums up his findings and their import to the present people of North Dakota in these mild yet potent words. "The history obtained from the tree rings seems to carry considerable comfort to the present inhabitants of the region. If human beings have found the area well enough suited for some seven hundred years to be a home from which there was no high incentive to move in search of better surroundings, and since there has obviously been no change in rainfall conditions for a period of some 540 years, the present dwellers in the region may well look forward to centuries of continued occupancy of the region by a reasonably prosperous population. And further as the residents become more familiar with the region and its conditions the task of so regulating their activities as to better coordinate with climatic conditions should serve to definitely increase their prosperity."

The farmer in North Dakota may well thank archaeology for the assurance of a future undimmed by dread of droughts, famine, and failure.

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Textiles of Highland Guatemala. LILA M. O'NEALE. Publication, Carnegie Institution of Washington, No. 567. Washington, 1945. x+319 pages, frontispiece, 130 figures (including 55 collotype plates), glossary, bibliography, $5.00 in paper cover, $5.50 in cloth.

This important work will undoubtedly serve as the source book on contemporary weaving in Middle America for many years to come. The study consists of four major parts, the first comprising a description of the material, methods, and techniques of weaving. Part two is an analysis of garments and accessories, and the third part is a consideration of the weaver, including the learning and teaching of weaving. Part four is a study, town by town, of complete costumes for men and women.

In general this book will be of limited interest to the archaeologist, but certain aspects of it are important, for any reconstruction of prehistoric Maya textiles will have to depend on contemporary sources. Some of the methods in use today appear to be of considerable antiquity; others are obviously European introductions. Perhaps of special interest to archaeologists are the data on yarn tie-dyeing, for this is an expression of a broader pattern of negative or resist decoration found in many forms over much of the New World. There is no proof, however, that yarn tie-dyeing, as now practiced, is of prehistoric origin.

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Mission Monuments of New Mexico. EDGAR L. HEWETT AND REGINALD G. FISHER. Handbooks of Archaeological History, University of New Mexico and the School of American Research. Albuquerque: University of New Mexico Press, 1943.

Mission Monuments of New Mexico is an historical and non-technical study of the mission ruins of Pecos, Abo, Quarai, Gran Quivira, and Jemez, all of which are uncertainly dated from 1617 to 1630. The mission of Acoma, which is still in use, is included. In addition, cursory treatment is given to many of the Franciscan chapels and churches which are still in service in New Mexico. Although the scope on the whole is historical in nature, scattered throughout the volume are sections on the missions which should prove of interest to the archaeologist concerned with the period of Indian-white contact. This publication, with the technical study of mission architecture by George Kubler, "The Religious Architecture of New Mexico in the Colonial Period and Since the American Occupation," *Contributions of the Taylor Museum*, 1940, contains the main body of information as yet published relating to the missions of New Mexico.

The first part of the historical section furnishes an account of the life of St. Francis of Assisi and the growth of the Franciscan Order, which lays the foundation for the understanding of mission history in New Mexico. A resume of the Franciscan activity of New Mexico, written in a romanticized style, follows.

The next portion of the publication is devoted to a terse description of the missions which are found in the modern pueblos. This section represents little more than a cataloguing and holds little of interest to the student because of its brevity. A more detailed summary of the history of each of the missions completes the main body of the publication.

The last chapter describes the Museum of New Mexico's acquisition and excavation of the mission sites. Information is included regarding the techniques of excavation and repair of the ruins. It is emphasized that stabilization and repair of the ruins has been the main objective. The main techniques followed are described by the senior writer thus: "We will not put back a single block of stone more than is necessary to arrest destruction . . . when it is important for the information of the public, make a model of a building or a restoration on paper, clearly indicating where it is conjectural, and let it go at that." In the repair of the ruins particular attention was given to the recapping of the walls and the filling in of undercut areas. An asphalt compound known as bitu-adobe was utilized in the mixing of the mortar.

In this chapter are included summaries of the excavations of the various missions. The first mission ruin reported on is that of Quarai. Both the mission and monastery were uncovered and repaired. The mission was built of sandstone in cruciform shape and had a long axis of 100 feet. In the mission were found charred roof beams, probably indicative of Apache raids, and a terraced altar reminiscent of an Indian rain altar. Excavation of the monastery revealed a square Indian kiva in the center of the main plaza, a large series of ecclesiastical rooms, and a watchtower. In one of the store rooms was found another terraced adobe altar. Artifacts included a large amount of historical material such as Spanish metal tools, porcelain fragments, and historic glaze wares. Shapes of the pottery of Indian manufacture showed Spanish influence.

The excavation of the mission and monastery of Abo revealed certain similarities to the Quarai Mission such as the

burnt roof timbers and the kiva in the west court of the monastery. This kiva, however, was circular and gave indications of having been filled in by refuse from the monastery kitchen. Turkey pens built of stone were uncovered in conjunction with the monastery. The artifacts include a large range of porcelain wares, late glaze sherds, and metal objects. Remain of the buffalo occurred in the refuse areas.

The excavation of the Pecos Mission and Monastery, in 1939–40, revealed the mission to be a large cruciform structure, built of adobe. Two doorways capped by arches were encountered. The Pecos Mission was not abandoned until 1838 and since that time considerable destruction has occurred at the site. The main body of work consisted in repairing and stabilizing the structure. Pottery found was classified as being 98 per cent of Indian manufacture and 2 per cent porcelain and miscellaneous types.

A summary of the excavations of 1921–22 of the Jemez Mission of Guisewa is included. Features of interest found in the excavations included murals on the mission walls, an outside chapel, a watchtower built to the rear of the church and circular, indicating that the roof may have been supported by heavy timber pillars. The last mission ruin described in this publication is Gran Quivira. The excavations of 1923 revealed the usual cruciform mission built of stone, and a monastery section consisting of a patio, cloisters, refectory, living quarters, and corrals.

In the appendix of the publication are lists and brief bibliographies of the Franciscans who founded the various churches of New Mexico. Sixty-seven photographs of varying quality are included as illustrations. Although the publication contains much information for the historian, the archaeologist must wait until more detailed and technical reports are published on the excavations of these ruins before he can gain an adequate understanding of this period of Indian-White contact.

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The Eastern Timbira. Curt Nimuendajú. Translated and edited by Robert Lowie. University of California Publications in American Archaeology and Ethnology, Vol. 41. Berkeley: University of California Press, 1946.

This is the third monograph to appear by Curt Nimuendajú on the northwestern and central Gê-speaking tribes of the arid steppe regions of northeastern Brazil. The first to be published was a study of the Apinayé;[1] the second was concerned with the Šerénte.[2] While the present monograph refers primarily to the Ramkõ'kamekra tribe (so-called "Canella"), "the author," as Professor Lowie says in his short preface, "has given such ample data on the history and ethnography of all related tribes that the title *Eastern Timbira* seems fully warranted" (p. v).[3] The present monograph is the most complete and detailed of the three and, backed up by the other two monographs and a series of articles concerning the Timbira which have appeared by Nimuendajú and Lowie, it is a major contribution to American ethnography.

Until comparatively recently the standard concept of the ethnography of this region was one of the simple Tapuya inhabiting the interior plateau of northeastern Brazil, while the Tupi with a "higher culture" lived along the coast. Of the "Tapuya" it was said that "all reports considered, these tribes are of low culture and notorious cannibals. They were non-agricultural, did not work stone, and made little pretense of weaving."[4] The survey of old sources for the eastern and southern Gê by Herman Plötz and Alfred Métraux indicated that this traditional concept was erroneous[5] but Nimuendajú's field studies have shown how radically wrong and over-simplified was this concept of the "Tapuya." "Tapuya" means, of course, non-Tupi (viz., enemies). Many of the tribes formerly assigned to "Tapuya" were evidentally isolated stocks and the very diverse Gê tribes, which were also called Tapuyan, were found not to have enough in common to be classified as one cultural group. In this present volume, Nimuendajú's scholarly historical survey of the various tribes of the eastern Timbira as well as his careful critiques of earlier writers such as Ribeiro, Martius, Von den Steinen, Ehrenreich, Rivet, Schmidt, and Snethelage clears out much of the confusion in our picture of this complex area. His description of eastern Timbira subsistence economics contradicts the old idea of "non-agriculturalists" and his careful study of social organization and ceremonial life shows eastern Timbira culture to be anything but simple in these aspects. As compared to the Timbira tribes, the Tupi-Guarani tribes, with more intensive agriculture, have an extremely simple social and ceremonial life. The neighboring Guajajara (Tenetehara), for example, lack moieties or sibs. They have only extended family groups and their two principal ceremonials have none of the rich complexity of the Ramkõ'kamekra festivals.

Nimuendajú attributes some fifteen native American plants to the Eastern Timbira and at least one plant, a native creeper called *kupá* (*Cessus* sp.) seems to be cultivated only by the eastern and western Timbira and the Šerénte. It does not grow wild in the region and it is not cultivated by the surrounding peoples. It is perhaps "an old cultivated species peculiar to these tribes" (p. 59). Nimuendajú makes the point that "Tupí agriculture stresses maize and manioc, while the Northwestern and Central Gê emphasize potatoes and yams which virtually furnishes their daily bread but which plays a modest role among the Tupí" (p. 58). He does not believe that northwestern and central Gê received agriculture from the Tupi, although he seems to think that in aboriginal times hunting and gathering were perhaps more important for subsistence

[1] Curt Nimuendajú, "The Apinayé," *Anthropological Series, The Catholic University of America*, No. 8, Washington, 1939.

[2] Curt Nimuendajú, "The Šerénte," *Publication of the Frederick Webb Hodge Anniversary Publication Fund*, Los Angeles, 1942.

[3] The Apinayé belong to the western Timbira branch of the Northern Gê and the Šerénte to the *Akwe* branch of the Central Gê. See Lowie, Robert, "The Northwestern and Central Gê," "Handbook of South American Indians," *Bulletin, Bureau of American Ethnology* No. 143, Vol. 1, p. 477, 1946, for a classification of the northwestern and central Gê tribes.

[4] Wissler, Clark, *The American Indian*, Third Edition, New York, 1938, p. 257.

[5] Herman Plötz and Alfred Metraux, "La civilisation matérielle et la vie social et religieuse des indiens Ge du Brésil méridional et oriental," *Revista del Instituto de Etnologia, Universidad Nacional de Tucuman*, Vol. 1, pp. 107–238, Tucuman, 1930.

than agriculture among the Timbira. Material culture is in general very simple and it is of a very perishable nature (feather work, wood work, string work, basketry, wooden and palm fiber ceremonial objects, etc.). The northwestern and central Gê tribes do not make pottery.

The elaborate social structure of the Rąmkõ'kamekra and of the other northwestern and central Gê tribes came as a surprise to most students of South American ethnography. In a review there is hardly space to describe the complexities of their social organization and Professor Lowie has written of the significance of these discoveries elsewhere.[6] In short, the Rąmkõ'kamekra are divided into four distinct moieties—matrilineal exogamic moieties, nonexogamic rainy season moieties, plaza group moieties, and age class moieties. There are in addition six men's societies. Ceremonial life, relating in a great part to these groupings, is highly complex. Each year during the dry season (July to December) either one phase of the intricate initiation rites of the age classes is performed, or one of the three main festivals—the Mummer's Festival (the Mummers are one of the six men's societies), the Warrior Festival, or the Fish Mouth Festival—is celebrated. The initiation rites involve two distinct ceremonies, both of which must be performed twice for each age class and the four occasions are spread out at intervals over a period of ten years. At any one time, "The four youngest and athletically active of the recognized classes occupy each a distinct place in the plaza, two on the east and two on the west side" (p. 90). They change the position of their station in the plaza as younger age classes move in. Each time a new age class takes a station in the plaza, the oldest age class retires from active sport life and takes up its position in the center of the plaza as part of the council (p. 90).

If these Timbira tribes had become extinct before they were studied, the archaeologist, burdened with an erroneous picture of their culture, would have had a very difficult time trying to piece together the cultural history of the region, especially in view of their very perishable material culture. This is another striking example of the necessity of cooperation between archaeology and ethnology. Nimuendajú through his intensive studies of one group of related tribes has cleared out much of the confusion about this region but there are still some major problems to be unraveled before we understand the cultural history of the region. Many important tribes are already extinct and others must be studied soon by ethnologists before they disappear. There is a serious need in eastern South America for scientific archaeology before the interrelations of the various cultures can be understood. In Apinayé territory and on the Araguaya River, for example, potsherds are found which are distinctly unlike Tupi-Guarani pottery and which indicate an earlier element in the region. Those of us who have been working in the general region would like to tempt away archaeologists from the more spectacular scene of West Coast South America.

One cannot write of Nimuendajú's work among the northwestern and central Gê without mentioning the cooperation of Professor Robert Lowie. It is doubtful whether the Gê monographs would have appeared in the form which they did, and it is almost certain that they would not have appeared in English, if it had not been for Professor Lowie's close cooperation with Nimuendajú. The field work was done under the auspices of the University of California, Institute of Social Sciences. Nimuendajú corresponded frequently with Professor Lowie as his work progressed. It was Professor Lowie who constantly pointed out the significance of Nimuendajú's discoveries to New World archaeology and ethnography. The cooperation of these two men was a particularly happy combination which ended with Nimuendajú's untimely death while he was among the Tukuna Indians of the upper Solimões River in December, 1945.

While throughout this monograph, Nimuendajú gives examples of native behavior and of native attitudes, it seems to me rather unfortunate that he did not include more such informal data, which I am certain he knew and had even recorded. He had a profound knowledge of Rąmkõ'kamekra culture and a closer relationship with these people than most field workers can hope for. We always want more of anything that is good and I agree with Professor Lowie that "this work represents one of the outstanding achievements among studies of South American Indians" (Preface, p. v).

The monograph has good maps and pictures; the bibliography will be a great aid to anyone who is interested in the region.

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[6] Robert H. Lowie, "A Note on Northern Gê Tribes of Brazil," *American Anthropologist*, N.S., Vol. 43, Menasha, 1941, pp. 188–95.

NOTES AND NEWS

PLAINS AREA

The North Dakota State Historical Society has no appropriation for any large amount of work, but hopes to cooperate with the Federal archaeological research and meantime is working on Northern Plains pottery. It has also gotten track of a location on the Heart River which is in one of the areas to be flooded, where there seems to be a considerable deposit of Mandan pottery and possibly a village site, which the Society hopes to investigate. The Society may be able to do some research, also, in conjunction with Dr. Hewes of the State University. It has permission to work a little along the Sheyenne River where there are possibilities of one or two village sites of tribes not so far identified.

News from South Dakota, contributed by W. H. Over, Director of the University Museum, includes the following items:

"Due to emergency conditions brought about by the building of proposed dams along the Missouri River in the near future, active efforts will be carried out the coming summer to investigate certain old Indian village sites that in the past have been neglected, and until this is done the history of early Indian habitation in the state cannot be determined nor completed.

"Tentative plans now are for Dr. Waldo R. Wedel, Assistant Curator of Archaeology, U. S. National Museum, to take charge and supervise the investigations. There are at least a score of these older sites along the river from twenty-five miles below Pierre and reaching to the North Dakota state line. These are scattered among the 140 villages that have been located along the river.

"These older sites have always been considered as of Mandan origin but further investigations are necessary definitely to determine their historical status, etc.

"Mr. Wedel, with his experience in mid-western archaeological research, is well fitted to assist us in solving the above problems."

The Museum of Natural History at the University of Kansas hopes to have an archaeological party in the field next summer. Excavations will be confined to areas immediately threatened with inundation. Activity at the present time is confined to a study of existing local collections, a reorganization of the Museum materials, and occasional survey work.

At the University of Oklahoma, Mrs. Virginia D. Watson has been making surveys of reservoir valleys to be inundated by the waters of dams under construction. Indications are that three of the four projected dams will require archaelological work. During the summer, excavation is planned in two of the reservoir valleys. The field work probably will include sites in the flood area of the dam known as Wister Reservoir, in the eastern part of Oklahoma. (*W. R. W.*)

NORTHEAST AREA

As a result of the interest of the Indiana Historical Society in determining the archaeological culture of the Delaware Indians, a number of field parties from different institutions will work in the Delaware Valley this summer. A party from the Rochester Museum of Arts and Sciences under Dr. William A. Ritchie and accompanied by Edmund S. Carpenter of the University of Pennsylvania will work in the upper regions of the Delaware. A party directed by Dr. Dorothy Cross Jensen will work in western New Jersey, while a third party composed of John Witthoft and Richard S. MacNeish will operate in eastern Pennsylvania under the auspices of the Pennsylvania Historical Commission and the Museum of Anthropology of the University of Michigan. It is hoped that the summer's field work will considerably increase the definiteness with which specific types of material both on the protohistoric and late prehistoric levels can be attributed to the Delaware. (*J. B. G.*)

SOUTHEAST AREA

With John W. Griffin as archaeologist-in-charge and Hale G. Smith, assistant archaeologist, the Florida Park Service has begun a survey of the state. Some excavation is planned and certain sites are to be restored and preserved. At the close of 1946 some sites on state parks were test-trenched. A historic mound in south-central Florida disclosed some trade material in the form of beads, copper and silver pendants, iron axes, and hawk's bells. With these objects was a fragment of a Spanish pot, all of which indicate a date of the seventeenth or early eighteenth century.

Charles H. Fairbanks is now custodian at Fort Frederica National Monument, St. Simons, Goergia, where excavations of the colonial fort and town of Frederica are planned. At present, however, most of the activity there is concerned with survey work and test-pitting certain sites. Three shell middens have been located and sampled. Dr. A. R. Kelly, custodian at Ocmulgee National Monument, Macon, Georgia, is working on his Swift Creek report, and his doctoral thesis on Mexican race mixture is to be published by the Middle American Research Institute. Dr. Robert Wauchope, of the Institute, has recently completed a preliminary study of the Georgia pottery excavated in 1938–40. Some survey work in Middle America is in order for early 1947, while writing continues on publications of the Institute.

David DeJarnette has returned from a tour of the Pacific area to resume his duties as Curator of the Alabama Museum of Natural History, Tuscaloosa. Steve Wimberly, archaeologist, is working on publications which will report on the excavations made in three southern Alabama counties. Dr. Walter Jones, Director of the Museum, has returned also, augmenting the Museum's collections with specimens from Australia and New Guinea.

In Tennessee, T. M. N. Lewis has just completed surveys of the Wautaga and South Holstein reservoir areas. In Kentucky, a survey of the Wolf Creek Dam reservoir on the Cumberland River is getting under way. A bulletin on four Green River shell heaps has been sent to the printer, and the reports of the 1946 excavation of an Adena mound and the physical anthropological study of the Indian Knoll people are in preparation.

The Central Mississippi Valley Archaeological Survey shows signs of reviving. Phillips has been doing the bulk of

FIG. 76. Archaeological zones in western Mexico.

the work on the collections. He also was in the field in the spring of 1946 and is returning in March of this year. Ford and Griffin are aiding in the analysis, description, and preparation of the report. Following the completing of this report, it is planned to extend the survey to the north and south and to conduct extensive excavations at certain key sites. (*W. G. H.*)

THE FOURTH ROUND TABLE CONFERENCE IN MEXICO

The Fourth Round Table Conference of the Sociedad Mexicana de Antropología was held in Chapultepec Castle in Mexico City throughout the week of September 23, 1946. As is customary in these conferences the papers and discussions were devoted to a predetermined theme, that

of this conference being "The Anthropological and Historical Problems of Western Mexico." Seventy-two persons were registered members of the conference. Ten of these were anthropologists from the United States who made the trip to Mexico especially for the meetings. Other Americans resident in Mexico also attended.

These Round Table conferences have a reputation for being well organized and smoothly run, and due to the exertions of the organizing committee, headed by Dr. Rubin de la Borbolla, this was no exception. Summaries of every paper to be presented were duplicated and handed to all members before the meetings began. Another great convenience was the notation and duplication of the important portions of all the discussions, copies of which were distributed at the following session. Furthermore, many of the archaeological materials under discussion had been attractively installed in a number of lighted cases arranged around the walls of the meeting room and this allowed convenient reference to actual specimens.

Dr. Alfonso Caso was elected and served as chairman of the conference, and Doctors Rubin de la Borbolla and Isabel Kelly as secretaries. A leader of each subject division was also elected at the beginning of the conference, whose duty it was to summarize at the end the material presented in his division. These subject divisions form the headings in the following account.

In light of the definite plans that have been made to publish a *Memoria* of this Round Table conference, no attempt will be made here even to list the many papers presented. Only a general summary of the more significant contributions and some indication of the present status of anthropological research in the area under discussion will be given.

Anthropogeography. An able summary by Jorgé Vivó of the geologic and geographic characteristics of the area under consideration was the only paper in this division.

Physical anthropology. T. Dale Stewart opened a lively discussion by indicating that a peculiar type of cranial deformation, that of a lambdoid flattening, appears to be confined to only the late prehistoric periods in the Mexican area. It was generally agreed that more attention should be paid to cranial deformation as a cultural trait than has been done in the past.

Javier Romero and Johanna Faulhaber reported on recent anthropometric work of the Museo Nacional on the modern populations of several towns in northern Guerrero.

Archaeology. Three days were devoted to the reading and discussion of papers on archaeology. Pedro Armillas opened the subject with a survey of the papers to be presented and the significant topics needing discussion. At his suggestion it was agreed to divide the area under consideration into three regions, each one to be taken up separately. The three regions were as follows: the central zone (Michoacán), the northwestern zone (Sinaloa, Nayarit, Jalisco, Colima), and the southern zone (Guerrero).

Of importance in regard to the archaeology of the central zone was Rubin de la Borbolla's paper in which he defined three cultural phases for central Michoacán. This sequence is based on his recent extensive excavations at Tzintzuntzan, the capitol of the Tarascan Empire at the time of the Spanish Conquest, and there is good evidence that the last phase was in existence at that time. Rubin de la Borbolla believes the two earlier phases to have been ancestral to the last, but there was nevertheless considerable objection to naming them Tarascan. In any event, the word Tarascan should never again be indiscriminately applied to archaeological cultures of many kinds all over western Mexico as has been done in the past.

Within the last several years considerable work has been done at Chupícuaro, Guanajuato, and fresh material from this important zone was presented. Murial Porter and Elma Estrada Balmori described the pottery and other objects from the site, while Rubin de la Borbolla discussed the culture in more general terms. It has become clear that the Chupícuaro complex is quite distinct from the cultures of central Michoacán and is probably contemporary with the later portion of the Archaic Period of the Valley of Mexico.

Little time was spent in a discussion of the northwestern zone due to the lack of any very recent work in the region. An outstanding contribution, however, was a map presented by Isabel Kelly in which she divided the extensive area in which she has worked into fourteen ceramic provinces extending from northern Sinaloa to Apatzingán in southwestern Michoacán.

Due largely to several recent surveys by Armillas, Weitlaner, Barlow, and others in Guerrero, considerable success was attained in outlining cultural areas and something of it chronological sequence in that State. Ekholm and Weitlaner reported on stratigraphic tests made at Acapulco and in the region of San Jeronimo, respectively, and these, plus material gathered by Armillas as far west as Zihuatanejo, indicate the existence of a distinctive culture area along the coast of Guerrero. The cultures of this area appear to have been quite different from those of the Sierra and the Balsas River Valley to the north. Of particular interest was Eric Thompson's suggestion that there are strong Maya resemblances in several kinds of material from the State of Guerrero. Miguel Covarrubias analyzed the carved stone objects which occur in abundance in Guerrero and which show both Olmec or La Venta and Teotihuacán influence.

During the last day of the meetings a masterly summary of all of the archaeological papers and discussions was presented by Pedro Armillas with the help of Eduardo Noguera. This summary was primarily in the form of a map dividing the area of western Mexico into a number of archaeological zones and a chart placing the known cultures of the various zones in tentative chronological alignment. Although far from complete and probably inaccurate in many details, this map and chart form the principal contribution of the archaeological discussions of the conference and are reproduced here (Fig. 76, Table 7). For the first time, some semblance of order has been achieved in a great area of Mexico which until now has been extremely vague and confused. A great deal of work remains to be done, but we now have a general scheme which will serve as a guide for future work and which can gradually be perfected.

Linguistics, ethnography, and ancient history. The present status of linguistic studies in western Mexico was summarized by Wigberto Jimenez Moreno, while Roberto Weitlaner reported his studies on the different dialects of Nahuatl found in Guerrero. Paul Kirchhoff analyzed the

TABLE 7. CHRONOLOGY IN WESTERN MEXICO

(*Note:* The chronological position of the italicized complexes is more certain; that of the others largely hypothetical.)

	Sinaloa	Jalisco	Colima	Apatzingán	Cojumatlán	Zamora	Tzintzuntzan	Middle Lerma	Middle Balsas	Yestla	Costa Grande	Taxco-Zumpango-Mexcala
1500	*Culiacán*	*Autlán*	*Periquillo*	*Chila*		*La Crucita*	*Upper*			*Yestla*		
		Milpa			*Polychrome*		*Middle*					Tepecocuil-co-Mescala
			Armerilla									
	Aztatlán	Cofradía		Tepetate	*Red-on-Brown*	Potrero	Lower		Vista Hermosa			Teloloapan
1000	Huatabampo-Early and Middle Chametla		Colima			Jiquilpan			Mexiquito		*Coyuca de Benítez* (long supports)	
		Tuxcacuesco	*Orlices*	*Apatzingán-*							*Tumbuco*	
500				*Delicias*							(Acapulco II)	
				Chumbícuaro								
0						*Curutarán*		Chupícuaro	Amuco-Tancanhuato		San Jerónimo (Acapulco I)	
500 B.C.								*El Opeño*				

ethnography of the area on the basis of the earliest historical accounts, pointing out that certain cultures of western Mexico contained a number of elements quite outside of the Mesoamerican pattern. A detailed analysis of the Lienzo de Jucutácato by Wigberto Jimenez Moreno was considered to reflect early population movements in Michoacán. Robert Barlow presented a summary of a detailed study of the various conquests made by the Aztec in the State of Guerrero. These are only the most significant of the papers presented in this rich and important field of research.

Modern ethnology. Nine papers in this discussion detailed the present situation in regard to the study of the contemporary peoples of western Mexico. For the most part, these papers concerned the Tarascans who have been the subject of extensive study during the last few years. The work of the Tarascan project was summarized by both George Foster and Ralph Beals, while others made reports on specific villages, on Tarascan linguistics, and on the present geographic distribution of Tarascan peoples.

The next Round Table Conference. It was decided to devote the next Round Table Conference to the problem of the eastern Gulf Coast of Mexico, as implied in the title "The Huastecs, Totonacs, and Their Neighbors." (*G.F.E.*)

SOUTH AMERICA

The Viru Valley program of the Institute of Andean Research continued throughout 1946 in northern Peru. Following the Chiclin Conference (see AMERICAN ANTIQUITY, Vol. 12, pp. 132–134), Drs. Bennett, Strong, and Willey, of Yale University, Columbia University, and the Bureau of American Ethnology, respectively, completed their field and preliminary laboratory studies and departed from the base of operations in Trujillo early in September.

During the month of September, Drs. Collier and Willey made a brief survey trip down the Peruvian coast to Camana, inland to Arequipa and Puno, north to Cuzco and Ayacucho, and to Lima by way of Huancayo. They were joined in Cuzco by Dr. John H. Rowe, of Peabody Museum, Harvard University. The most interesting highlights of the trip were a visit to the University Museum in Arequipa, brief exploration of a midden site near Andahuaylas, and an excursion to Huari near Ayacucho. The Huari site is an important but little known one in Peruvian archaeology, and it appears to be a center for the widely spread Coast Tiahuanaco style.

On his return to Viru in October, Collier continued his work for the Chicago Natural History Museum, as a part of the Institute of Andean Research program, for the next two months. With the aim of defining more precisely the Coast Tiahuanaco period in this region, he excavated in Tiahuanaco rubbish and uncovered a number of Tiahuanaco burials. His excavations in refuse containing both Salinar and Guanape (Cupisnique) material furnished evidence suggesting that there was a gradual transition from Guanape to Salinar rather than a sharp break between the two periods as previous data had indicated.

Mr. James A. Ford, of the American Museum of Natural History, conducted a survey of sites in the Santa and Chicama Valleys during the months of October to December. Surface collections of pottery were made for a comparative analysis with similar survey materials from the Viru Valley.

Mr. Junius Bird, of the American Museum of Natural History, continued his excavations in deposits of the preceramic and early ceramic periods of the El Brujo sector, Chicama Valley. Mr. Bird is concluding this field work as this notice goes to press.

Sr. Rafael Larco Hoyle, Director of the Museum at Chiclin, directed grave excavations in the Chicama Valley during the latter part of 1946. These excavations centered around the problem of the Viru Negative of Gallinazo style and its relationships to the Mochica and Salinar cultures.

South Americanists in this country will regret to learn of the death, at Chiclin, Peru, of Sr. Ing. Javier Larco Hoyle. The news of Sr. Larco's death was announced in the Lima newspapers on January 2, 1947. Sr. Larco, the younger brother of Sr. Rafael Larco Hoyle and the son of Sr. Rafael Larco Herrera, was the Assistant Director of the Museum at Chiclin and had been actively engaged in the study of north Peruvian archaeology for several years. (*G. R. W.*)

NOTE ON THE GRUTA DE CANDONGA IN THE ARGENTINE REPUBLIC

Professor Castellanos has called my attention to a misspelling in my review: "Recent work on early man at the Gruta de Ca[n]donga in the Argentine Republic" published in this journal, vol. 11, pp. 58–60, 1946. By my error, the name Candonga is given as Cadonga. In spite of this defect, Professor Castellanos is pleased at this recognition of recent progress in our sister republic and has translated and republished the review. For bibliographers, the reference is: Bryan, Kirk, "Reciente trabajo sobre el hombre primitivo en la Gruta de Candonga en la República Argentina," *Cronica Bibliográfica*, G-1945, por Alfredo Castellanos y Pierina Pasotti, Rosario: Inst. Fisiograf. y Geol. de la Univ. Nac. del Litoral, pp. 47–55, 1946. (*Kirk Bryan.*)

SOME RECENT PUBLICATIONS

The following abbreviations appear in the list which follows:

AA, American Anthropologist, New Series. Menasha, Wisconsin.
AcAm, Acta Americana. Los Angeles.
AMNH-AP, American Museum of Natural History, Anthropological Papers. New York.
ASC-B, Archeological Society of Connecticut, Bulletin. New Haven.
ASC-NL, Archeological Society of Connecticut, News-Letter. New Haven.
ASD-B, Archeological Society of Delaware, Bulletin. Wilmington.
AV, Acta Venezolana. Caracas.
BA, Boletín de Arqueología. Bogotá.
BAE-B, Bureau of American Ethnology, Bulletin. Washington.
BBAA, Boletín Bibliográfico de Antropología Americana. Mexico City.
CIW-NMAA, Carnegie Institution of Washington, Division of Historical Research, Notes on Middle American Archaeology. Washington.
CIW-P, Carnegie Institution of Washington, Publications. Washington.
CNHM-B, Chicago Natural History Museum, Bulletin. Chicago.
E, Ethnos. Stockholm.
EP, El Palacio. Santa Fe.
IEA-A, Instituto de Etnología Americana, Anales. Mendoza.
ISAS-J, Illinois State Archaeological Society, Journal. Champlain.
K, The Kiva. Tucson.
M, The Masterkey. Los Angeles.
MAIHF-C, Museum of the American Indian, Heye Foundation, Contributions. New York.
MASAL-P, Michigan Academy of Science, Arts and Letters, Papers. Ann Arbor.
MAS-B, Massachusetts Archaeological Society, Bulletin. Andover.
ME, Museum Echoes. Columbus.
MiA, The Minnesota Archaeologist. Minneapolis.
MLP-N, Museo de la Plata, Notas. La Plata.
MLP-R, Museo de la Plata, Revista, New Series. La Plata.
MoA, The Missouri Archaeologist. Columbia.
MP, Medallion Papers. Globe, Arizona.
MS, Museum Service, Rochester.
NYSAA-RT, New York State Archaeological Association, Researches and Transactions. Rochester.
P, Plateau. Flagstaff.
PA, Pennsylvania Archaeologist. Harrisburg.
PM-P, Peabody Museum of American Archaeology and Ethnology, Papers. Cambridge.
RAE, Revista de Arquelogía y Etnología, Segunda Epoca. Habana.
RMEA, Revista Mexicana de Estudios Antropológicos. Mexico City.
RSPFA-P, Robert S. Peabody Foundation for Archaeology, Papers. Andover.
SAP-J, Société des Americanistes de Paris, Journal. Paris.
SBMNH-ML, Santa Barbara Museum of Natural History, Museum Leaflet. Santa Barbara.
SI-R, Smithsonian Institution, Annual Report. Washington.
SJA, Southwestern Journal of Anthropology. Albuquerque.
SL, Southwestern Lore. Gunnison, Colorado.
SM, Scientific Monthly. Washington.
T, Tzunpame. San Salvador.
TA, Tennessee Archaeologist. Knoxville.
TAPS-B, Texas Archaeological and Paleontological Society, Bulletin. Abilene.
TT, Tlatelolco a través de los Tiempos. Mexico City.
UC-PAAE, University of California Publications in American Archaeology and Ethnology. Berkeley and Los Angeles.
UCPA-AS, University of Chicago Publications in Anthropology, Archaeological Series.
UNC-P, Universidad Nacional de Córdoba, Publicaciones. Córdoba.
VFPA, Viking Fund Publications in Anthropology. New York.
YUPA, Yale University Publications in Anthropology. New Haven.
WA, The Wisconsin Archaeologist. Milwaukee.

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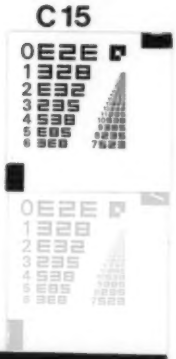
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